

THE
SECOND PART OF THE
PRINCIPLES
OF THE
ART MILITARY,

Practised

In the Warres of the United Provinces.

CONSISTING OF THE SEVERALL FORMES OF BATTELS, REPRESENTED BY THE
Illustrious MAURICE PRINCE of ORANGE
of famous memorie.

AND HIS HIGHNESSE FREDERICK HENRY PRINCE OF
ORANGE, that is Captaine Generall of the Army of the high
and mighty Lords the STATES GENERALL
of the United Provinces.

Together with

The order and forme of Quartering, Encamping, and Approching,
in a Warre offensive and defensive.

*The second Edition newly corrected and amended by Captaine HENRY HEXHAM,
Quartermaster to the Regiment of the Honourable
Colonell GORING.*



Printed at Delf in HOLLAND, By Antony of Heusden,
ANNO 1642.

Cum Privilegio.

THE
SECOND PART OF THE
PRINCIPLES

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE



T O

THE TRVELY HONORABLE, AND HIS

NOBLE LORD, GEORGE GORING, BARON OF HOS-

PERPOINT, VICE-CHAMBERLAINE TO HIS SACRED

Maiestie, and one of his Majties most honorable
privie Council.

MY LORD,



According to my promise and weake ability, I had composed and finished this *second part of the Principles of the Art Militarie*, for so much as concerns the duties of the Officers of Feild, belonging to an Armie, and the diverse orders, and formes of embattailling of Horse and Foote represented in the feild at severall times, and in sundry places by the two famous Generals of our age, *Maurice Prince of Oran* of happie memorie, and *Frederick Henry* his highnesse the Prince of Oran that now is our victorious Generall, together with the order of *Quartering*, *Encamping* and *Approching* in a Warre *Offensive* and *Defensive*: This I vndertook with a great deale of labour and charge, and gathered it out of diverse good Authours, for the instruction and informing the Iudgments of such, as are lovers of this *noble Art Militarie*, & having heretofore bin dedicated to my honorable Colonell your Sonne, having tasted of your Lo: bountie both for my *Atlas Majours*, and some other of my *Militarie* bookes more then of any noblemans in England to shew & acknowledg a gratefull minde, therefore this second Edition comes in most humble wise, to craue your Lo: gracious *Patronage*, as one to whome I acknowledg my self much bound vnto, and so praying to the Almighty for your health & encrease of honor. I rest

Your Lo: servant ever to Command

HENRY HEXHAM.

An Index,

Of the contents of this second part, & how the Boockbinder is to place the Cards.


Of the Provost Marshall of an Armie,	pag. 1.
Of the Marshall of a Regiment, a Quartermaster Generall, & a Quartermaster of a particular Regiment,	pag. 2.
Of a Trench-Master, an Inginier & a Clark of the Victuals	pag. 3.
Of a Carriage-Master, and a Muster-Master	pag. 4.
Of the Sarjant Maiour to a Regiment	pag. 5.
Of a Lieutenant Colonell, and a Colonel	pag. 6.
Of the Sarjant Maiour Generall of an Army	pag. 7.
Of a Sarjant Maiour of a Brigade, or a great Corporall of the feild	pag. 8.
Of the Generall or Master of the Ordnance, & of the Clark of the Munition and Materialls	pag. 9.
Of the Lord Marshall of the Feild	pag. 10.
Of the office and charge of the Lord Generall of an Army	pag. 11. 12. 13.
In what order an Army ought to march over a Campagny, narrow passages, woods, and Rivers	pag. 14. 15. 16.
Of the Quartermaster Generall, of a Commissary Generall, & of a Lieutenant Generall of the Horse	pag. 17.
Of the charge and Office of the Generall of the Horse	pag. 18.
Of the ordering and forming of a Devision, or a Battaillon of Foote or Horse	pag. 19.
Of the Forme of an Armie of 24. thousand foote & six thousand Horse ranged in Battell ray as the figure demonstrates	pag. 20.
Next followes the severall formes of Battels of Horse and foote, which have bin shovne in the low Countries since Anno 1600. till this last yeare 1642. and are all to be placed Alphabetically from A. to X. one after another betweene pages	30. & 21.
Of the order and forme of encamping of an Army	pag. 21. 22. 23. 24.
Of the quartering of a Devision or Regiment of foote according to the order of his Highnesse the Prince of Orange	pag. 25.
Note that betweene the pages 26. & 27. the figure of a Regiment of foote is to be bound	pag. 26. 27.
Betweene pages 28. & 29. is to be bound in the figure of a Regiment of Horse	28. 29.
Betweene pag. 32. & 43. which is false figured, the figure & forme of a Campe quartered, that is betweene letter H. & I.	pag. 32. 33.
Of all manner of Approches and their profiles	pages 33. 34. 35. 36. 37. 38.
Note that this sheete i. should have bin figured	33. 34. 35. & 36.
Note that betweene pages 38. & 39. the figure of Approches is to be bound	pag. 40.
Of Counter-Approches	pag. 41. 42.
Of all sorts of Bridges	pag. 43.
Of Galleries and their Appurtenances	44. 45.
Note that betweene pages 44. & 45. is to be bound the figure of a Gallerie.	pag. 46. 47. 48. 49. & 50.
Of Mines and Counter-Mines	pag. 51.
Of all sorts of Palisadoes, Barrocadoes, quadrant Footnailes & Beares	pag. 52. 53.
Of turne Pike	pag. 54. 55. & 56.
Of Retrenchings of Inward cutting, of	

Hoe de Boeck-binder sal de Caerten van dit tweede deel binden.

1. Tusschen fol: 20 en 21 alle de Caerten van Slachorders, van letter A. to X. Anno 1642.
2. Tusschen fol: 26. ende 27. de quartier van een Regiment te voet.
3. Tusschen fol: 28. en 29. de quartier van een Regiment te Paert.
4. Tusschen fol: 32. en 33. de quartier van een heel Legher.
5. Tusschen fol: 38. en 39. de Caert van Approches.
6. Tusschen fol: 44. en 45. de Caert van een Gallerie ende Mynen.
7. Tusschen fol: 54. en 55. de Caert van Retrenchementen ende afsnijdinge.

THE SEVERALL DUTIES OF THE OFFICERS OF
the feild belonging to an Armie.

And first of the Provost Marshall of an Army.

Ecause in the nature of his Office he is to execute all directions and commandements, that he shall receive from the Lord Generall, or Marshall, he shall be enjoyned to give his attendance upon the Lord Marshall. It is then his office to publish all Proclamations, Orders and Decrees of the Generals, and all things else that are to be notified to the Troupes, as the Lord Marshall shall command him: He shall see them published in the Generals Quarter, and before the Head of every Regiment, being attended upon, by the Provosts of every Regiment.

He shall have the keeping of the Prisoners in the Army, that is to say, by himself and his men, he shall keep the chiefe Prisoners which are to be brought to Justice, and shall direct the Provosts of every Regiment, how the Prisoners in their charge shall be kept.

He shall have thus far forth command over all particular Provosts of the Armie, and they shall give an account to him of all their Prisoners, of the quality of their offences and of the informations against them, yea, as often as he shall direct and give up a note as well of his owne prisoners, as of the rest, once every weeke to the Lord Marshall.

He shall attend every Court day at the Generals, or the Lord Marshals, if it be held there, and shall bring his Prisoners that are called thither, safely to the Court, with such informations and witnesses as are to be brought in against them, and shall after they have bin heard, and proceeded withall, bring them back in safety, and so keep them till he hath attended and known the further will of the Generall, or in his absence, of the Lord Marshall: Also he shall be bound to have his Executioner, a place of execution, and all things belonging unto it, whensoever, or wheresoever he shall be commanded by the Generall or Lord Marshall, and he shall see the said executions so commanded, to be duly performed.

The Provost Marshall shall have thus far commandement over the Victuallers of the Army, that he shall assigne them their Quarter in every Regiment, and shall appoint what Victuallers are to attend every Regiment. Also he shall give order to the particular Provosts of every Regiment, that they see no victuals sold but at convenient houres, and that the prices of victuals and beere be reasonable, and every Kan of Beer, sold at that price as he hath marked upon the Barrell-head, and as it is appointed him.

It is further incident to his office, to have account brought unto him of all prizes of Cattle, and other victuals that comes into the Army, and that the preyes, as soone as they are brought into the Quarter, shall be shewed to him, and by him to the Generall, or the Commissary Generall of the victuals, because it may be known whether those preyes be lawfull, and how they ought to be divided.

He shall by the particular Provosts of every Regiment and his men, cause all entrails of Beasts that are killed in or near the Quarter, and all other garbidge and filth to be buried without the Campe, and to see in all things else, that the Quarters be kept sweet from noisome smells, and the places adioyning clean, and that the places for easement be pricke out at such a convenient distance, as he shall in discretion set down, and that he himself, as often as he can conveniently, shall visit the whole Quarters, and to that end, he shall cause the provosts of every Regiment, and his owne men, to visit the severall parts of the quarters every day.

He shall have all his fees, as well in preyes that are taken, as for the oversight of the victuals and beere, and of all things else, which do properly belong to the provost Marshall of an Army.

The second part of the principles of the art Military.

Of the Marshall of a Regiment.

THe masshall of a Regiment is to receive and keepe safely all such prisoners, as are committed to his charge by the Chiefes, Captaines, and officers of the Regiment, and if they be called to Iustice, shall bring his Prisoners to the Marshall Generall, to be carryed from thence to the Councell of Warre.

It is also the duty of the Marshall of a Regiment, to take speciall care that all women, lacqueis, servants, bread, and *Aqua Vita* sellers belonging to the Regiment, shall march after their owne Regiment, and not before, or upon the flankes thereof.

It is his office likewise to set such prizes upon Beere and Victuals, as the Lord Marshall or the Serjant Majour Generall shall appoint him, which order he shall receive from the Provost Marshall of the Army, and that he sees it be duely executed within the circuit of the Regiment, and that the Sutlers do not sell their beere and victuals above the set rate, least they should grate upon the Souldiers: After the Captain of the watch hath gone the first round, he is to see that the Sutlers keeps no tipling or drinking, to commit any disorder in the night, but make them put out their candle light and fires: During the time of divine service he is to go the round, and see that there be no tipling or disorders committed in the Quarters.

The Office of a Quartermaster Generall.

First he is to be at all removes, and before the taking up of any quarter, is to attend the Generall, or the Marshall of the field, to receive his directions, where, and in what place the Army is to be quartered, and how the Avantguard, the Battle, and the Reere, shall be distinguished.

Having received then his directions, and the Army drawing neare to the place assigned, he and the Quartermasters of every Regiment, rides before with a Guard of Horse and some firelocks, to view and make choise of the Ground, where the Army is to be quartered, and there ordaines a quarter for the Generall, the chiefe Officers of the field, and their trains, together with the Regiments of every *Tercia* or *Brigade*, and gives out the ground, and houles to the quartermaster of each *Brigade*, and they to the Quartermasters of the particular Regiments, who drawes out the quarters in that order and forme, as the Lord Generall hath prescribed, and as the figure thereof following shall demonstrate.

It is also his office to direct the Quartermaster of every Regiment, that in laying out their quarters, they observe that forme which the Generall hath commanded, that is proportion for proportion, and to see that all places of armes, streets, sallies, and all things else, be answerable, and sees that every quarter be made according to that modell.

The Office of the Quartermaster of a Regiment.

THe quartermaster of a Regiment in all charges is to attend the quartermaster generall to receive his directions, and takes the place, ground, and houles appointed by him for the quarter and lodging of his Regiment, and then drawes out his quarter, for the companies his Colonels, and the officers of the field, and for every Captaine of his Regiment, according to the order of their march and their seignorities in the Regiment, distributing and giving to a Sariant of every Company of the Regiment, who are to assist and attend him, the depth, length and breadth, of the quarter with the distances of the *alarme place* betweene the head of the quarter and the trench, and the true distance betweene devision and division of the regiments, as also when the regiment is to be quartered in Villages, and houles, he is also to observe that forme and directions which the quartermaster Generall shall give him.

The

The Office of a Trench-Master.

BEcause as Quarter-master he shall know the Ground that is laid out : so he is to exercise the office of the Trench-master in the Outworks of the quarter, as he doth of Quartermaster within, these two offices having affinity the one with the other, and therefore he must set out distance between the quarter and the Trench, or Rampier, with the breadth and depth of the ditch, and the height of the Trench, be the quarter altogether entrenched or in part, as he shall receive his direction, either from the Generall, or the Marshall, as also the proportion of all outworks, as Flanks, Mounts, Batteries, and other works that shall be appointed.

As it is shown what is the duty of a Trench-master in encamping : so in marching he is to give direction for the making of waies or *Explanadoes* for the passing of the Troupes, and marching of the Ordnance and Carriages, according as he shall receive his order, from the Generall or Marshall, provided that in making wayes for the Artillery, he take the Quartermaster along with him, assigned by the Generall of the Ordnance for that purpose and that the Carriage master or conductor of the Artillery and carriages, go also with him.

In all Approches he is to take charge of the Trenches, and other works made in them, and after he hath received direction from the Generall or Marshall, he shall give directions to all those that work, and see that the works be made in such sort as they are appointed : In which service both Pyoniers, workemen, and commanded men shall obey him.

Of an Ingenier.

AN Ingenier ought to be a man very skilfull and experienced in *Arithmetick, Geometry* and the *Mathematicks*, and before he begins to breake ground, or run his lines of Approches, he ought to consider well the situation of the place, and to have regard to the propriety and nature of the place, whither it be high ground, low, plain or hillie.

By day he viewes well the ground, that he may the better run his approches by night, in setting out his sticks and markes, that he may place his men, to get speedily into the ground with the more safety, and as he advances to make the Corpses of Guard, and the batteries upon the most advantageous places, for if he should mistake his ground, and not runne his line and approach well by turning and winding it, and carrying it from the Bulwarks, Flanks and outworks of a Towne or Fort, he may endanger the lives of many men, and therefore it behooves him to be very circumspect and carefull, but of this we will speak more at large, when we come to handle Approaches.

The Office of the Commissary Generall of the Victuals.

HE is to take charge of all the Victuals prepared for the Army, as well by water as by land, and to see either by himself or his Ministers the proportion of Victuals to be duely distributed to the souldiers, and Marriners, as the Generall or the Admirall shall direct him.

All Purfers, Stewards, and all other, that shall in any ship have charge, and the oversight of the Victuals (as also all under Commissers and Conductors of victuals by land) shall upon the discovery of the extraordinary wasting, spoyling, or miscarrying of Victuals, presently give notice thereof to the Generall, or to the Commissary Generall of the Victuals, that he may presently take order about them.

Wheresoever the Army shall land, march, or lodge, all the victuals found in such places, shall be seized upon by him, and a proportion set out by him for the present use of the Troupes, there quartered, and the rest reserved as part of the generall store and Magazine of victuals, and to that end, he himselfe shall go, or send an under officer, or the Clarke to attend the Lord Marshall, or Quarter master generall, when he goes to view and appoint him his quarter.

The second part of the principles of the art Military.

He shall keep a list of all the Bakers, Millers, and Butchers in the Army, and of all others that are used about the provisions of Victuals, that he may set them on work, as the occasion, and the service may require.

All ovens, and instruments of mills, for grinding, baking, or for preparing, bestowing, carrying, or for the preserving of Victuals and provisions, shall be under his charge, and he shall have authority to use and dispose of them for the publick service.

If any prizes of Victuals shall be taken at Sea or by Land, the Commissarie Generall of the Victuals shall take a note and inventory thereof, and appoint some officer of his to take charge over them.

If any preyes be taken by Land, he shall likewise keep an inventory of them, and view them himself, and shall make the devision, as the Generall shall direct him, or in his absence; the Marshall of the feild.

He shall give out no Victuals but by speciall order and warrant from the Generall, and from time to time, he shall give up unto him a perfect account of the Wast, spoyling, or miscarrying of Victuals, either in the Armie by Sea, or by Land.

The Cariage Master his Office.

HE is with as much authority to order and marshall all the Carriages of the Army, as the Serjeant Majour Generall is to marshall the Troupes.

He shall see the carriages of the Munition first placed in the best and safest places, next the carriages and traine of the Generall, and the chiefe officers of the Field, the next by turnes: but because the incumbrances of Carriages may often times disorder the whole troupes, he shall receive his directions from the Seriant Majour Generall of the Armie, where his charge shall march, though the particular disposing and ordering of the carriages be left to himself.

He shall have three severall men, or officers under him called Conductors, to attend upon the severall devisions of the Carriages, as sometimes upon the baggage of the Avantguard, the Battle, and the Reere: sometimes upon the Carriages of the munition and Ordnance; the Generals and chiefe Officers carriages, so that in the order of the march, they shall be devided into three bodies, and he shall have some smiths, carpenters, and wheel-wrights attending upon every severall division: His best order in marshalling the carriages, will be to observe the same order, as the Sariant Maiour doth in marshalling the Regiments which by the Provost Marshall of every Regiment, he may give notice to all those that goe along with the carriages.

His direction being given, he shall oversee the whole order of March for all the carriages, and shall cause the Provosts of the severall Regiments to keep the same order.

The Muster Masters Office.

HE having received his orders, he shall make a generall muster of the whole Army before it be imbarqued, or marches, and keep a perfect list of the number of Armes, whereof he shall deliver a true list to the Generall, that he may know the strength of the Army. He is to make reviewes, as often as the Generall, or in his absence, the Marshall of the Feild shall appoint him, and alter his list, as he sees it alter in strength, and to keep notes of the alteration, betwixt every muster, and of the diminishing of the strength of the troupes, that is to say, when men are slain upon service, and what are dead of sicknesse, and what men are run away, or discharged by passport.

He shall be obeyed and respected in the execution of his office, no Colonell or Captain shall refuse to shew him their men, whensoever he shall require them, either from the State or the Generall.

Of the three chiefe Officers of a Regiment, and first of the Seriant Majour.

THE Seriant Majour of a Regiment ought to be a valliant man, an old Soldier, and one that is well experienced in the way of his profession: upon all occasions his place gives him access to the Generall, to the Marshall of the Field, and to the Seriant Majour Generall of the Army, to know, how and in what manner his Colonels Regiment is to march, whether in one body alone, or else in two divisions ioyned with others.

Whereupon he gives order how the Regiment is to be marshalled and ordered in what forme the Companies are to draw, and when upon any service they are disbanded, how to rally them again, as is required.

He receives his orders and commands either immediately from the Generall, as is said, or from the Marshall, or Seriant Majour Generall, whether the Regiment be to march in the Avantguard, Battle or Reere, he ought to have some knowledge how the Countie lies, through which the Army is to march, whether over a spacious Campaigne in battail, or through narrow passages, woods, over rivers, or the like, by drawing out of files, as the ground and passage will afford, as also what order and forme the Regiment is to keepe, if they should be charged with Horse, have Ordnance playing upon them, or being troubled with baggage.

In the presence of his Colonell and lieutenant Colonell, he is to be an assistant to them in seeing all orders and directions executed and performed, and in the absence of them both, to have the same authority and command, as the Colonell or Lieutenant Colonell shall have.

In marching or embattailing he shall keepe as neere the middest of the Regiment as he can, either in the Front, the Reere, or upon either flank, so as he may best overlook and observe the order of their march or embattailing.

The Regiment being drawn up in divisions, he gives to every Captain and Officer his place, according to his Seigniority, and withall commands the Drum-major and the other Drumms to beat a March, and to move all at an instant, and sees that the Soldiers keepe well their rankes and files, and none to disbande themselves, or straggle.

He is to come every morning and evening to the Seriant majour Generall of the Army, or to the Seriant Majour of that Brigade or Tercia, to receive the word and orders from him, if there be no extraordinary cause to hinder him, and when he hath received the word from the Seriant Majour Generall, or from the Seriant Majour of the Tercia, his Colonell and Lieutenant Colonell being present in the quarter, he gives them first the word and the orders, and afterward delivers it over to the Seriant of every Company of the Regiment, drawn in a ring, according to the Seigniority of their Captaines, which are to come and attend upon him for the same.

As he doth receive directions for marching, embattailing, viewing of ground, and placing of Guards, from the Seriant Majour Generall, or the Seriant Majour of that Brigade: so he is to deliver them over to the Captaines, and Officers of that regiment, and to call upon them to whom it appertaines, to see them duely executed.

Every night he is to visite all the guardes of that regiment, and to keepe duely the times of their Watches, and marches, (that one Captaine or Company may not do more duty then an other) as also in sending out Troupes upon service, to the end that both the honor and the labour may be equally divided.

It is also his duty to speak for ammunition, as powder, bullets, and match, and for victuals for the regiment if there should be any want, and to see them equally distributed to the Companies, according to the proportion given out, and finally to give order and proportion for the number of workemen, or commanded men of the regiment which are to go to worke.

The second part of the principles of the art Military.

Of a Lieutenant Colonell.

THe next place above a Sariant Maiour is a Lieutenant Colonell, which is an honorable charge, when his Colonell is present he is to obey him, in seeing all the commands and directions that are delivered by any publick officer, or such as shall be within the authority of a Colonell himself, to be duely executed in the absence of his Colonell, having as absolute command and authority over the Regiment as the Colonell hath himselfe.

In marching or embattailling if the Regiment consists but of one division, whensoever the Colonell is in the head of his Regiment, his place is to bring up the Reere of the Regiment, but if it consists of two divisions, then the Colonell leads the first, and the Lieutenant Colonell the second, but when his Colonell shall be in the Reere marching from an Enemy, his place is then to be in the head of the Regiment.

If the Regiment consists of two Battaillons his division is to quarter and lodge on the left hand of his Colonels, and himself in the Reere of his owne Companie.

Of a Colonell.

THe Colonell of a Regiment hath a very honorable command, and is called in Spanisht *Maestro del Campo*, that is, one of the masters of the Feild, and therefore ought to be a man of authority and respect, having absolute command and authority over the Captaines and Officers of his Regiment, and all such are to respect and obey his commands, as fully as they would do the chiefeest Commanders, and ought to love and honour him, which his valour, wisdome and discretion will acquire him.

Also he is to see, that all orders, commands and directions, which are delivered him by the publick Officers of the Army, for guards, marches, quartering, or any thing else, as for matter of Iustice, for ordering of the Troupes, and furtherance of the service, be duely executed and performed within his owne Troupes: Further, if he himselfe do find any mutinie, or any discontented humors tending to mutinie, extreme outrage or disorder, or shall be by any of his Captaines, Officers or Souldiers informed of any such thing, he shall forthwith advertise the Lord Generall or Marshall of the Feild: And if he find any other fault, negligence, or swarving from the directions or policy of the Army set down, he shall straightway acquaint them by whom such direction came, or was to come unto him, or some other superior Officer, and shall produce the party so offending with the Witnesses and Proofes, that order may be given forthwith, and Iustice done: And if he faile to give this information of any thing he knows or heares of, he shall be thought deeply faulty, and if any such things passe without his knowledge, he shall be thought of worse government then befits a man of his place and charge.

Upon marches the Colonell shall be at the end of his Troupes, that is, next to the Enemy in the head of his Regiment going towards an Enemy, and in the Reere comming off, and is not to go from thence, except it be for the ordering of his Troups, or for some extraordinary occasion, as to attend the Generall, or the chiefe officers of the field.

He is also to see and command the Officers of his Regiment, that their men be well armed and duely exercised.

A Colonell being one of the chiefe Officers of the Feild, ought to be called to take councell and advice with the Generall, especially when any peece of service is to be done, or in the day of Battell, which concernes his charge, where he may freely speake his opinion, and give his advice touching matters of weight and importance, and though his opinion may be good, yet if the most voices be of the contrary opinion, and that things in the execution thereof fall out ill and contrary to his owne opinion, he ought nevertheless to give way and yeeld to the plurality of voices, and wholly obeying his Generall be ready to

to execute all his commands, giving thereby to understand that the contrary opinion held by him in the Councill of Warre, was neither for want of courage nor affection.

A Colonell also ought to give all respect, love, and obedience to the Generall of the Army, the Lord Marshall, and the Sariant Maiour generall of the Field, as having charge from the Generall to give out orders, as also to quarter and appoint alarme places, the place of Battle, for marching, choosing of Guards, and sending out of convoies. Moreover the Colonell once every weeke, may call together all his Captaines to enquire of all offences hapned in his Regiment, and examine duely the nature and quality of such offences, and to prepare the cause for a more short and easie hearing in a Marshall Court, for all Colonels are to repair to a court of Warre as often as they shall be warned, as an assistant to the Lord Marshall, and the president of the Councill of warre, for all causes that shall be questioned there, belonging to the Iustice of the Army.

Finally in quartering, or lodging, if his Regiment consists of two divisions, his quarter is in the division, that is betwene his two battailions assigned for his Regiment, because he may give best and speedy directions to the whole, this shall be showne more particularly, when we come to draw out the quarter for a Colonell and his Regiment.

Of the Sarjant Majour Generall of an Armie.

THe Office of a Sariant Maiour Generall of an Army is a place and charge of a high degree, whose command is full of action, and therefore he ought to be an able, a wise, a grave and able person experienced in the way of his profession.

He is to come to the Lord Generall or Lord Marshall for his orders and directions for all watches and Guards that are to be placed, and upon the charge of a quarter or a remove he is to march with the Lord Generall or Marshall in the Avantguard (after he hath seen the Troupes settled in the order of their march) and to view well the places appointed him by the Generall or Marshall for the placing of the Guards, upon the very first Arrivall of the Troupes.

Having received the word, and his orders from the Generall, or the Marshall, he gives them to the three Sariant Maiours of the Tercias, called also the three Corporals of the Feild, and they give both the word and orders to the Sariant Maiours of every particular Regiment.

He himselfe in the beginning of the night, after the warning peece is gone off, and that all guards are settled, he is to visit them, and gives order to the three sariant maiours or grand Corporals of the field, which attend upon the Avantguard, the Battell, and the Reere, at what time they (or some chiefe Officer of the feild) shall go the grand round, and if he or they finde any thing amisse, or any thing extraordinary discovered, either when he goeth himselfe, or one of the three Sariant Maiours of the Brigades, or any other chiefe Office, they are to give him an account of what they find amisse, and he is to advertize the Lord Generall or Marshall therewith.

In a day of Battell or any kind of skirmish or fight, he is to receive his directions from the Lord Generall or Marshall, and to see them duely executed.

Also in a day of Battell he hath the ordering and disposing of the divisions and battailions, according to that forme which the Generall shall command him, and upon all occasions must be active and stirring up and downe, to spye out all advantages, which might offend an Enemy, and wisely to foresee all disadvantages which might bring the Troupes into any disorder or confusion.

Moreover he is to be the chiefe Officer with the Quartermaster Generall which is to be at the Randevous for the disposing of the Troupes of Horse and foote, as also by giving out orders for the providing them with ammunition and victuals.

And being arrived first at the Randevous, he is to give the Lord Generall and the Marshall of the feild to understand the state of the army, that the Lord Generall thereupon may give him command and direction, how & in what manner the army is to be ordered, and afterward gives order to the sariant maiours of the Tercias, and they to the Sarjant maiours of every regiment for the providing of ammunition victuals and all things necessary for the ordering of the marche.

The second part of the principles of the art Military.

Hee ought to be well acquainted with those passages and wayes throw which the Army is to march, and doth commonly march himselfe in the head of the avantgard, having some light horse and fire-locks to attend him, and to send out some troupes to discover the wayes and passages for the discovery and preventing of Ambushments, having the Capitaine of the pyoniers and his men to waite upon him, and the quartermaster Generall, for the making and explaining of wayes for the Army, that they may not be surprized on a sudden, and drawing neere unto the place of quartering or encamping, he and the quartermaster Generall riding afore, do view, and choose out such ground and villages as may bee most commodious for the lodging and quartering of the Army.

To conclude, he is to have absolute command over the three Sariant Maiours of the Brigades, otherwise called the three grand Corporalls of the field, who are to be his assistants and his mouth, as he is the mouth of the Lord Generall, or the Marshall, and therefore hath a vigilant eye over all things, and sees that the Generalls commands delivered to him be strictly kept and observed.

The office of the three Sariant Maiours of the Tercias otherwise called the three Corporalls of the field.

THe States Army by order from his highnesse the Prince of Orange is commonly divided upon a march into three Brigades or Tercias. In French he is called *Le Marechal*, or *Le Sariant Maiour de bataille*, and in English one of the great Corporalls of the field. A Sariant Maiour then of a Tercia doth receive his order immediately from the Lord Generall himselfe, or the Lord Marshall, but most commonly from the Sariant Maiour Generall above mentioned. To wit, in what forme the Brigade or Tercia is to be ordered, and how many regiments of foot and horse are to march under it, and with what ordnance and baggage. He assignes and shewes them the place, where they are to draw out in battallie, and receives order from the Sariant Maiour Generall whether they are to march in the Avantgard, the Battell, or the reere, so that in marching every one of these three shall attend upon his Brigade, and severall divisions, and in the absence of the Sariant Maiour generall see that the order of marching and embattallie be duely kept and observed. And every one of these three Sariants maiours de Brigade are to be at the command of the Colonoll Generall or he that leads and commands that Brigade or Tercia, and is to be sent to the Lord Generall the Lord Marshall or Sariant Maiour Generall upon any occasion which belongs to the present service.

These three Sariant Maiours of the Tercias are to be lodged as neere the Sariant Maiour Generall as conveniently may be. And these three which attends upon the Avantgard the Battell and the Reere with the Sariant Maiour shal make choise of ground for the placing of guards, and assigne them to the Sariant Maiours of every Regiment, they are to goe the Round and to visit the guard commonly every night, and at such an houre as the Sariant Maiour shall appoint them either by day or night.

If any of these three Sariant Maiours of the field shall find any want of powder muniti-on or victualls, either in the Avantgard, Battell, or Reere, as well upon a march, as when the troupes are quartered or during a fight. He is presently to advertize the Sariant Maiour Generall with the said wants, and then by his direction shall goe with an officer of every Regiment of that Tercia to the Generall or Lieutenant of the ordnance, or to the commissary Generall of the amunition or victualls.

To conclude, he having received his orders from the Lord Generall the Marshall or the Sariant Maiour Generall gives them to the Sariant Maiours of the particular regiments but because the word and the orders are to be sent to quarters farr distant one from another, the Sariant Maiour of every regiment cannot come conveniently to the Sariant Maiour Generall. Therefore the Sariant Maiour of the Brigades are to attend every morning and evening upon the Sariant Maiour Generall, of the Army to receive their orders and to carry the word to the severall quarters, whether the Sariant Maiour of the regiments comes to him, and from him receive the word and orders.

Of the Generall, or Master of the Ordnance.

HE hath the charge of all the Artillery, Armes, Munition, Ingiens, Materials, and Instruments of work, yea of all things belonging to the Ordnance, As beddings, platformes, carriages, and whatsoever else appertaines to the Office of the master of the Ordnance.

Vnder the Lord Generall he hath absolute command over all officers appertaining to that Train, as the Lieutenant of the Ordnance, the Controuler, the Clark, the Gentlemen of the Ordnance, The Master-gunners, Armorers, Munitions, Ingeniers, Captaines of Pyoniers, and Mineurs, over all Smiths, Carpenters, and Wheelwrights, as also over all Artificers, and attendants upon the train of the Artillerie, Munitions and Materials.

The General of the ordnance (after the places for batteries are chosen and assigned him by the Generall of the Armie) he is to obserue, command and direct the making of Bedds and platformes for the ordnance, he is also to give direction for the making of waies and explanadoes, for the bringing up of the ordnance to their batteries and to see that the batteries be made Cannon-prooffe, and the port-holes so that the ordnance may most annoy an Enemy.

And after he is once commanded by the Generall to begin a battery, he is to give order to his inferiour officers to play and beat with the ordnance upon such and such places till the Lord Generall, giueth direction to the contrary, and as occasion and ground is gained to advance and remove the ordnance to neerer places. Also in a day of battell or fight he is to chioose the most advantagious places for the planting of ordnance where they may gaule or offend an enemy most, and to have a vigilant eye, that all things be done in good order.

All the Artillery and carriages belonging to the train of his office upon a march or quarter to be in the safest place of the Army, and therefore are to take place before all other carriages unlesse some of the Ordnance be drawne to march in the Avantguard, Battell, or Reere, or to some other places: where the necessity of the service may require.

He is to make lawes and orders for the well governing of the officers of his train and all officers appertaining to his charge, with which he is to make the Generall acquainted, that he from time to time may know the state of the ordnance, and of all things else belonging thereunto, and to take care that the service of the land be not defrauded.

Of the Commis or Clark of the Munition and Materials.

THE Clarke of the Munition, and Materials, Marches under the train of the Generall of the ordnance, he by order from the Generall or Sariant Maiour Generall is to give out all munition, as Powder Match, and Bullets, to the Regiments, and Captaines according to the list or proportion commanded him by the Generall, and as he receives his bullet from the Sariant Maiour Generall, which orders being given out the Sariants of every company repaires to his quarter and lodging to receive it, and to give him an acquittance under their hands for the receipt thereof. Likewise he is to take an account what powder, bullets, and match is short away and spent in the Approaches and Trenches, and the Colonnell which commands there gives him a note how much was spent the night and day during his command there, because he is to give up an account to the States and General how many barrills of powder, bullets, and match was spent in the said approaches.

More over, for entrenching outworks and Approches he is to deliver to the quartermaster of every Regiment so many materials, to wit, Spades, Showels, Axes, Pickaxes, Hatchits, and bills, as there are workemen Commanded out of every Regiment and company which are to goe to work, which Materials the quartermaster of every Regiment is to passe his hand for, and to distribute them to the severall companies, and when the work is ended to deliver them up to him againe or to give him a reconing how many were broken or lost upon service that the commis may render an account to the States.

The second part of the principles of the art Military.

Of the Lord Marshall of the Feild.

THe Lord marshall of the feild is in command and authority next unto the Lord Generall, as is (as it were) his Lievtenant and mouth, and therefore haueing so eminent a place, he ought to be acquainted with all the duties of the officers of the feild: especially with the Generalls office it selfe, because there is such an affinity betwixt them, as haueing absolute power to command the Army in the Generalls absence, and may oftentimes be employed to command the Army himselfe, as commonly the marshals of France doe.

His office is also to see that Iustice be duely administred, and that the Lawes, Articles, and ordinances of marshall discipline be strictly kept and observed, that all banishments, and proclamations, coming either from the Generall, or the Councell of warre, be published, and executed, and by his authority, to cause malefactours, and offenders, to be punished for an example of others. And seeing that all he doth is for the generall good of the whole Army, he ought to be feared, honoured, and respected of all men, and in no wise contradicted, seeing it is his proper charge to take care that the policie and discipline of the Army established by the Generall, bee exactly kept and maintained under his authority.

All quarrels and duels hapning between officer and officer, souldier, and souldier either of horse or of foote, ought to be brought before him, seeing it is his office to right the wronged, and to punish the offender, or by his wisdom and authority to appease and compose them.

The Lord Marshall also when the Avantguard is drawn out, and are ranged in battallie while the barrell and the reere are dislodging, he sees and commands that both horse and foot march orderly and in their owne place.

And with some choise troupes marcheth before the Avantguard, and considers the waies and passages, as Valleys, Rivers, Marras, Boggs, Mountaines, Hills, Hedges, Woods, Hollow and Narrow waies, throw which the Army is to passe, that he may order the march accordingly as also to send out Scouts, Guides, Spies, to discover and get intelligence from an Enemy.

He marches also in the head of the armie, Sometimes with the Sariant Maiour Generall, the quartermaster Generall, and the quartermaster of the Regiments, as men experienced to view and make choice of the ground wherein the Army is to bee lodged and quartered.

He obserues also the order of marching, quartering, and fighting, the three chiefe things belonging to an Army, and sees and commands that the march, quartering, and fight, bee conformable to that order, which the Generall hath prescribed, and the deuisions, and Troupes being ranged in battallie, he is full of action, and considers the place and soyle of the ground, the advantages of the Sunn, Winde, and dast, and how the troupes with the most advantage may be brought to encounter an Enemy, takeing care that the order commanded by the Generall be not changed, and when the troupes are engaged in fight, he sees that they be duely seconded, and relieved, and being overlaid or charged, to cause them to retreat orderly for the avoiding of disorder and confusion, haueing a watchfull eye upon all casualties which may happen, for what the Lord Generall ordaines, the Lord Marshall sees performed and executed, to the end, that both their desires may take one and the same effect. For when commanders undertakes a waite, and fights with councell and iudgment, and sees all things also executed with wisdom, discretion, and valour, giving the succes to God, no man can then be blamed.

The Lord Marshall also ought to be acquainted with the Generals designe, and whether he is resolved to fight with an enemy or no. To consider whether he is to chage an enemy in the Front, in the Reere, or on the flankes, to hinder them from quartering, and to send out conuoyes for the cutting off, of his Viuals and provisions.

Hee

Practised in the Warres of the United Netherlands.

He ought to consider likewise how an Enemy lies encamped, which way he can come to attempt him, whether he is to march, and whither his designe tends, what order he keeps, with what Troupes he may hinder or annoy an Enemy, or being once engaged in fight, where and how he may best second and relieve his owne men, either with horse or foot, to place and bring up the divisions of Muskettiers, where they may most offend and gaul an Enemy, and the bodies of Pikes may with the most advantage be brought to give a charge, or a shock.

Also to understand and get intelligence of what force and strength an Enemy is, what baggage, carriages, and incumbrances he hath, and from whence his victuals and provisions are to come, to know whether any more forces are to ioyne with him, and how and in what manner he may break their conjunction.

He is also to have in a readinesse, an exact Mapp of that Country through which the Army is to march, and a description of all the waies, rivers and passages, through which the Army is to passe, having also by him good Guides, which are well acquainted with the severall passages of that Country and place.

The Lord Marshall likewise, with the Sariant Maiour Generall, ordaines and appoints all places for watches and Guards, either of Horse or Foote, which they assigne to the three Sariant Maiours of the Tercias, and they to the Sariant Maiours of the Regiments, and the places which they are to maintain and make good, also for alarme-places, and the choice of ground to fight a battell in, for the most safety and defence of the Army.

In the day of battell he must be stirring and full of action to give orders and directions where need most requires, and to encourage both officers and Souldiers to acquit themselves like men.

Vpon a march or the Army being encamped, he ought to counsell Tradesmen and victuallers, which bring provisions to the army, and gives command that they be not wrongd and abused by the Souldiers, but that they may sell their commodities peaceably: Likewise he gives order by his authority to the Provost Marshall Generall, and to the particular Marshalls of every Regiment, that they set reasonable rates and prizes upon victuals and beere for the good of the poore Souldier.

There are divers other points appertaining to the office of the Lord Marshal of the field which for brevities sake I omit.

The Office and charge of the Lord Generall of an Army.

A Generall hath absolute command over the whole Armie, and is to know and understand well the severall duties and charges of every inferiour Officer under his command, and ought to be a personage of great experience, wisdom and discretion, and capable to discern and choole the best of different opinions, which may often fall out in the councils of warre.

He ought also to be a personage descended of some noble House and Family, which will give a lustre unto his command, and a man of undaunted courage and authority, severe and austere in his command, and to be greatly feared, honoured, and respected, a man full of resolution and magnanimity in the day of battell, and constant and resolute in desperate cases, happy in his designes and enterprises, but above all religious, fearing and invoking God to be propitious and favourable unto him, to blesse his designes, and to pray unto the Lord of hostes to give him knowledge, understanding and policy to govern his armie well, and that he may keepe it in good order, and under good discipline, whereby it may become not onely capable of vanquishing, but also victorious, which depends alone upon the Almighty power of the Lord of Hostes, and that neither good nor bad

The second part of the principles of the art Military.

successes should make him change or alter his Countenance, but upon the hottest services to give out his orders and directions with temperance and moderation, without impatience, choller, cruelty or emulation against those that are under his command, especially those who have gained honour, and deserved well, which he ought rather to advance and reward, which will make him to be honoured, loved, and respected of all men.

A Generall also ought to be qualified with these excellent vertues, as wisdom, valour, experience, providence, constancy, authority, and liberality, and should well ponder and consider the occasion which might move him or engage him into a fight, or to give battell to an Enemy, he ought to be sparing and a good manager of the lives of his men, and not rashly and unadvisedly to hazard his Troupes, for he may aswell vanquish by policie, in putting on the Lyons skinne, and foreseeing all advantages and disadvantages, as by surprizing an Enemy unawares, as by laying hold upon an advantage, when their Troupes are in disorder, when they are disperfed, when they are dishartened, harried and wearied out, when they are pinched with hunger, thirst and cold, and such like casualties which may befall them.

Also by seeking to divert, amuze and devide their Arme, while he keepes his owne in peace, concord, and unity, which is one of the chiefeft points of Warre. To gaine time and advantageous places, to prevent and hinder an Enemy from possessing them, and to seeke by all meanes to breake an Enemies designe, and with all expedition to put his own into execution, and to premeditate and to overweigh with a thousand things, which depends upon the warre, having a vigilant eye upon all occasions, for the Art Military hath many difficulties attending upon it, and one is not able to expresse the many hazards, straights and plunges which befalls this profession.

He ought not lightly to hazard his men either in skirmishes, or in a battell, unlesse he be forced to it, and that upon very good grounds and advantages: for having flesht his men in small occasions, it hartens and embouldens his men, and gives them the more encouragement, and assurance of good success, for they perceiving the valliant, wise, and able carriage and conduct of their leaders and Commanders, especially of their Generall, this makes them fight bravely, and gives them hope of victory.

A Generall also ought to take the grave Concell and advice of his Chiefes and Commanders, and (as is said) to make choice of the best, and yet not to make known his owne resolution, for many a brave attempt and enterprize hath been broken for want of Secrecy, and if he should reveale it to some intimate friend: yet to do it as sparingly and reservedly as he can, by which meanes he shall gaine knowledge and experience, and in an instant will be ready to lay hold upon such and such occasions as may execute his resolution.

And

and there by make him capable of prevailing.

A Generall ought to take care, that his Armie be not wearied out, and fatigated overmuch, which breeds sicknesses, & causes the weakning thereof, to see & Command that the Regiments be well armed, & duely exercised in all the severall motions of warre, that Iustice be readily executed, to be favourable to good men, and severe against Euill-doers & Offendours. It is also the Office of a Generall to giue Charge, that the Armie be provided with Victuals, amunitions, and other things belonging to the warre.

A Generall ought to speake diuerse languages, for hauing to doe with sundrie Nations vnder his Command, being able to speake vnto them in their owne language, this giues a great deal of Contentment.

Mor eouer, he ought to be learned, a good *Mathematician*, & well seene in the points of *Fortification*, and to haue excellent *Inginiers* about him, that are carefull in running the lines of Approches, for the preservation of the liues of men.

It is requisite also, that he should haue good *Guides*, and spies about him, to get him intelligence of the State of an Enemie, & ought to spare no mony that way, for the breaking of an Enemies desaigne, and for the aduancing of his owne.

Abrave Generall also considers, that the force of an Armie consists not in the multitude of men, but in Valliant & well experienced souldiers, & Officers, which are well instructed, and trained vp in the vse of their armes, & knowes that Victorie consists not in many Troupes, but that an Enemies army being stronger then his, as hath often hapned by obseruing of good order, & discipline. choosung of aduantages of VVind, Sunne, and Ground together with the ready obedience of his men, in executing of his Commands, & by experience in their profession, they become more bould & confident in fight, so that an old beaten souldier, knowes by heart, what his Chiefe & Generall will require of him.

As a Generall should be beloued: so likewise he ought to be feared, & of the two among Cammon souldiers, rather to be feared, for the most part of them, vvill be soner restrayned from doing euill for feare of punishment, then for any loue they beare to their Generall.

To conclude, he ought to be experienced in the beleegring of Townes, & Forts, to view all places of aduantages, & vvhere an Enemy may most offend him, to fortifie his Campe strongly with lines of *Circumualation*, *Fortes* and vvorkes ypon it, to know the site, and situation of a tovvne, hovy, & in what manner those vvithin are able to defend it vvith men and munition, to cause his *Inginiers* to be very circumspect, and carefull how they run their lines, to sap forward to the vvakest part of the Tovvne or Fort, which he intends to become Master of, vvith diuerse other things requisite in a brave Generall, vvich for brevitie sake I will omit.

D

THE

NOW FOLLOVES IN VVHAT ORDER

*an Army ought to march in over a Campaigne, narrow passages,
Woods, and Rivers.*

HAVING shovvne the severall Offices of the Officers of the field, it resteth now to speak something in what order an Armie ought to march.

The Armie then being come to the *Rendezvous*, or being to disencampe from any place, the afternoone or evening before the breakeing vp of it, orders is giue out, that the Souldiers shal be provided vvith Munition, & so many dayes Victuals, as the Generall shall Command.

But an Enemy being neere at hand, vvhen the Generall vvill conceale the breakeing up they dravv into Armes silently, without founding of Drum, or Trumpet.

The Generall being attended vpon before his Lodging, by the *Sariant Majour Generall*, the *Quartermaster Generall*, the *Captaine of the Pionniers* and some other Officers.

The most part of the Armie, being dravvne into Armes, the Generall gives Command to the cheife *Inginier*, *Quartermaster* or some other, to throwv dovne the Trench, fill vp the Ditch, and to make such gappes in it, that vvhole devisions, & Battaillions may march through them.

After the Trench is cast dovne, the *Generall*, or the *Sariant Majour Generall* from him, gives order that the *Avantguards* shall draw forth, and marche a good distance without, and there to stand, & make a halt, till the *Battell*, & the *Reere* be also drawne out, in obseruing a convenient distance betweene them. In the interim the Ordinance, Carriages, waggons & baggage that belongs to the Armie, are likewise drawne out, and put into order. And the Guides, Scouts, and *Pyonniers* sent out before into the Countrie, to discover and to set out Centinels of Horse vpon all passages, and heighths, while the Armie is a marching forwards.

The Master of the Ordinance being present, Commandeth where the Ordinance and the traine of Carriages belonging to them shall march. And giveth order so the Conductours, & Inferiour Officers, to march forward, as the nature & propriety of the waies will permit. And if there be any rough waies, which are to be explained, he Ordaines the Captaine of the Pionniers, and his men to make them plaine & even, likewise all the waggons of Amunition, & Victuals with the baggage, are put in order by the Carriage Master & conductours of the traine: but the waggons and Carrs belonging to the horse, they are ordered by their Officers, to march according to the *seigniority* of everie Regiment.

How the Artillerie, and the Carriages are to March.

The Ordinance marches first with all the Carriages, and the *Pyonniers* are alwaies by them, having noe other waggons mingled among them, & so march in their order onely with one waggon before them, laden with spades, shovels, Axes, hachets, hand biles, and other instruments to make the wayes, & to explaine the ground & ditches, after which is drawne an Instrument, which doth make a *rut* vpon the waye, to show which vvay the Canon is to passe. The lesser lighter peeces of Ordinance layd vpon their Carriages follovv the said Instrument, & aftervvard the great peeces dravvne upon block-vvaggons vvhen there is no danger: but expecting to be encountred by an Enemy, they dravv them vpon their Carriages for feare of loosing time in mounting them, least an Enemy might fall suddenly vpon some part of the Armie. Next after the Ordinance follovv the vvaggons vvith Instruments, & Tooles for Carpenters, and Smiths, the vvaggons laden vvith Bullets, povvder, and match, and after them vvaggons vvith Pikes and muskets, all vvich being passed; then follovv the vvaggons belonging to the Generall of the Ordinance & his Inferiour Officers. And after them all the vvaggons laden vvith munition for the Ordinance, & the Armie, the vvaggons laden vvith Victuals, provisions, & vvaggons for the sick and hurt, and last of all the baggage, belonging to the Officers of the vvhole Armie.

But vvhen necessitie requires, some Feild peeces marches before in the head of the Armie
vvhen

When an Enemy is expected to fall on, vvith vvhich there marches some vvaggons laden vvith povvder, match, and Bullets to be vsed vpon any occasion.

All the Ordinance, carriages, and baggage being thus ordered, and the armie divided into the *Vanguard*, the *Battell* and the *Reere*: the *Sariant Maieurs* of the foote Regiments, and the Commissaries of the Horse Troupes, having order, shevves vvhich vvay they are to leade the Troupes, that they may give noc hindrance one to an other, & the *Generall*, or the *Sariant Maieur General* gives Command, that the *Vanguard* shall begin to march, and sends out before it Guides & light horsemen, to discover the passages: yet so, that they ride not so farre afore: but that they keepe alvvayes vvithin sight of the *Vanguard*, that vpon the discoverie of an Enemy, they may advertize and givi them vvarnin of it in time

The *Vanguard* then (as is sayd) hath commonly some small peeces of Ordinance marching before it, vvhich likewise may happen before the *Battell*, & in the *Reere* of all vvith a greater number of horse, and foote, as the necessitie may require: so that the three *Tercias* of the Armie, are all of the provided vvith Ordinance, vvhere it is thought most needefull and vvhere it is imagined an Enemy may give an attempt, either vpon the *Front*, the *Reere* or vpon either of the *Flankes*: for vvhich one can give noe certaine rule, but must defend themselves in that place, vvhere the occasion presenteth it selfe.

When a *Campaignie*, Heath, or Feild is spacious and large, then one may march in full Battaille by divisios, & close by one an other in good order, vvhich an Enemy perceiving, it may be he dares not offer battell, othervvise every devision, & *Battailion* may march by it selfe vvith more ease and liberty, then vvhen they are ioyned close together: yet so that in case of necessity they may easely be dravvne vp together, as likewise the Ordinance, & baggage dravvne to that place, vvhere they may be safest, and best defended by the troupes, if an Enemy should giue an attempt vpon them.

The vvaggons ought to be dravvne vp, and ranged into eight, or ten rancks close one to an other, that they may march vvithout hindring one an other, and the Ordinance may march vpon one of the flankes of the Armie, and some Feild peeces before if necessity should require, vvithout hindring, or putting the rest of the vvaggons into disorder, vvhich the Master of the Ordinance, or the Carriage Master, ought to Consider vvell, and take a speciall care of.

The Chiefe Officer vvhich Commaundeth the *Reereguard*, gives order that some Troupes of light horsemen shall march vvith in sight of the vvhole *Reere*, especially, vvhen they are to passe over a Heath, or *Campaignie*: but the Countrie having mountaines, hills, & vallies in it, then the horse may be commaunded to march sometimes in the *Vanguard*, & sometimes in the *Reere* of all the Armie, and keepe such vvatch, and centinels vpon the highest places, that an Enemy may not discover the strength of the Armie as it passeth, or in vvhat order it marches.

When the armie is to march throug some narrow passages, the *Vanguard* is commonly strengt hened vvith some foore, or Ordinance dravvne vp before it, least an Enemy migth surprize it, & marches the by files, & dravves vp as the conditiõ of the place vvill permit, In like manner the *Reereguard* in places of daunger, ought to be strengthened, as also the *Battell* to be ranged into such an order, that the Ordinance, & Baggage, being placed in the middest, may come best to serve, & relieve the other Troupes, from vvhen they may send Harquebussiers (as occasion serves) to attend both vpon the *Vanguard*, and the *Reere*, and as the ground vvill best afford.

In case that the vvaies and passages be so narrow, that the Ordinance, Carriages, & baggage takes vp so much time, that the *Vanguard* cannot be easely seconded by the *Reereguard*, then there may be appointed some Troupes of *Reserve*, vvhich may march along vvith the Carriages, & Baggage, to be disposed of in such a sort, that they may the better relieve those Troupes, vvhich should be overcharged by an Enemy.

Vpon such an occasion, one ought to consider and observe vvell, the nature, & conditiõ of that passage, throug vvhich the Armie is to march, vvwhether there be any vvindings and turnings in it, or other intricate vvaies, as throug vvoods, hills, and vallies, vvhere an Enemy may best lay his *Ambuscadoes*: therefore vpon every such turning, or crosse vvay,

The second part of The principles of the art militarie.

atroupe of horse, & some foote ought to be placed vpon it, to guard there, till the Ordinance, Carriages, & Baggage be past & out of daunger.

How one is to march through a wood.

But in passing through a Forrest, a great vwood, or a Grove, there ought to be placed good store of Horse vpon the vvaies that goes into it, & vvhether the Armie is to passe, to round & guard it vvel, a fvvell on the one side, as on the other. And if there be any plaine or open places in it, the Horse are to overspread it, and to dravv there vp in Battell for the securing of the passage, till the Ordinance & Baggage be al past, and that the foote, and Horse followv, vvhich are appointed as a Reserve to bring vp the Reere.

The Armie then having passed through a vwood, & come againe into a plaine *Campagne*, or Feild, some Horse are to guard the vway that comes out of the vwood, till the Horse troupes are dravvn vp in those Fields, and are possessed of the heights thereof.

How, and in what manner an Armie is to passe over a River.

When an Armie is to march through a Countrie, vvherein there are Rivers, & Brookes, the States Armie carries continually along vwith the some ten or twelue boates having plancks, Spars, Beames, ankors & Cables laden in them, and vpon those *Block-Waggons* that are dravvne with some tē, or twelve couple of horse, vvhich comming to a river, they presently take them dovvne, casts out their ankors, & laies them over the river, as broad as it is, & as many as they have vse of, ioyning them together, laying the beames, plancks, spars, & boards vpon them, & so in an instant, claps over a bridge, over vvhich the Armie Ordinance, & Carriages may passe vwithout daunger. Sometimes also for expedition sake they lay over bundles of floate, or slag bridges bound vp in Can vass, as also they make a bridge with Barrels & Hogsheds, in laying spars & planckes vpon them, being clasped & fastned hard together: so that foote & horse, and some small Feild peeces may march over them.

A Bridge then (having good Inginiers, Carpenters, and vvorkemen) is presently made over a River, or a brook, for the securing vvhich, there are certaine peeces of Ordinance, dravvne vp, and planted by the river side, to play vpon an Ennemie, if they should force the passage over it, and likewise dravve vp some *Harquebussiers*, lighthorsemen, firelocks, and muskettiers, to give fire vpon an Enemie, vvhile the bridge is a making. As soone as the bridge is layd over, some firelocks, halfepikes, & horse marches first over it, to maintaine and make good the other side of the river, till all the Armie & carriages be come over, & takes also along vwith them foure or fvvie small peeces of Ordinance, to scoure the passage, a vvaggon laden vwith povvder, and amunition, and some Pionniers to make the vvaies, hedges, & ditches, plaines, & expecting an Enemie at hand commonly cast vp a trench, or a vvorke on both sides of the bridge, having some 300 Souldiers to guard it, till the Armie & al the Carriages and Baggage be passed over it.


Nowv if an Enemie should seeke to oppose, & hinder your passage over it, the Ordinance horse, and firelookes above mentioned, are purposely vpon the Riverside, to free the passage, and to cleare the Coast.

FIRST

HAVING SHOWN THE DUTIES OF THE

Officers of the Feild, touching the Infanterie or foote, before I shew the severall forming & makeing of Battels. It is necessary that I briefly speak some thing of the Officers of the Feild, which commaunds the *Cavallrie* or Horse troupes, which are these, namely.

Of the Quartermaster Generall.

 He *Quartermaster Generall* of the horse, hath the particular *Quartermasters* of every troupe as his assistants to ease him, and to helpe him to discharge his place, either when the troupes are lodged in *houses*, or formally quartered in the feild, from him they receive their orders, and billets for their troupes, chaulking the name of their Captaines vpon the doores of every howse, where the troupe is to lodge. The further duties required in a *Quartermaster Generall*, are described in this second part, in speaking of the *Quartermaster Generall* of the foote.

Of the Commissarie Generall.

The *Commissarie Generall*s place ought to be given to a souldier of great experience, who hath bin bred vp in the warres, being a man of *valour* *wisedome* & discretion: in a *Commissarie Generall* is required also *vigilencie*, *dexterity* and an ability to compose Quarrels, and punish disorders which maye arise betweene officer, & officer, souldier, and souldier, what he cannot doe by faire meanes, he hath power & authority sufficient to punish them. It is also his dutie to give out orders, to appoint guards vpon *avenues* and passages, to keepe a list of all *guards*, *Convoyes*, & other *actions*, to receive orders from the *Generall*, or the *Lord Marshall* of the feild, to give it first to the *Generall* of the horse, and afterward to the *Quartermasters* of the troupes, that they maye giue them to their Captaines and superiour officers: also to range, & embattle the horse in that forme, and order, which his *Generall*, or *Lieutenant Generall* shall finde good, in whose absence he commaundeth the Horse.

Of the Lieutenant Generall.

The charge of a *Lieutenant Generall* of the horse is of great authority, & reputation, and therefore he ought to be a man of great experience, valour, and wisedome, carefull, & diligent for the well ordering of the troupes, because he commonly marches, with them, & lodged among them. He must haue knowledge of the waies, & passages through Countries, and choose the best waye, least meeting with an Ennemie, lying in *Ambuscado*, vpon a march, he maye giue him a blowe. Therefore, he must alwaies haue his minde buytsied vpon the motions of his Ennemie, discovering from what part they maye annoy him, be it either foote, or horse; in how many howers they can march vnto him, by what passages they maye assault him, to send out *Scouts* & *Spies* to giue him true intelligence, that he maye be provided for them, against some suddaine attempt. To giue encouragement to officers and souldiers in the day of battell, to carrie themselves brauely, to charge home, and to finde out all advantages, to breake and route their Ennemie. He ought not onely to carry himselfe lovingly to the souldiers in hearing them willingly: and assisting them in their necessities, but also to punish offenders seuerely, which will make him to be both feared, loved, and respected.

Of the Generall.

The *Generall* of the horse is one of the principall *chiefs* of an *Armie*, who ought to be a *Souldier* of great experience, and valour, & for the most part a personage descended of a noble *family*. Yea a man of a high spirit & commaund, for vnder his charge are the *finewer* of the principall forces of an *Armie*, from whose magnanimity, valour, & wiédome proceeds many times good successe, when occasions are offred, which are for the most part executed by the horse, especially in the day of battell, who charging in good order vpon an advantage, maye happely rout an *Ennemie*, and get the victorie, wheras contrarie wise, by the disorders of the horse, it maye breed great confusion and losse of men.

The *Generall* of the horse ought to take perticular notice, not onely of the *Captaines* and officers, but also of every gentleman and souldier that carries themselves bravely in the face of their *Ennemie*, and to honour and respect them in publick, which will encourage others to do the like, & when occasion presente it selfe, to advance them to military charges. Contrariwise to punish *Delinquents*. and such as doe not their endeavour, in doing whereof, he shall be honored, loued, feared, and respected of all men: last of all, by his high commaund, he giues commaund for the due exercising of his troupes, and helps in them their necessities.

To conclude, the proportion, or *grosse* of the States horse, answerable to their foote, consists in eighty troupes of horse namely *Curassiers*, *Carrabins* and *Harquebusiers*, two Companies of *Curassiers* and two Companies of *Harquebusiers* being ioyned together, according to his highnesse order make a *battaillon* or a *Devison*: These also being formed & ordered into ten Regiments, maye be drawne as the foote are into three *Brigades* or *Tercias*, making the *Avantgard* the *Battle* and the *Reere*, as yow see them ranged in the first figure, by observing their true distances.

What a goodly show it is, to see these 80 troupes of Horse drawne into three *brigades*, the *Generall* commanding in the head of the *Avantgard*, the *Commissarie Generall* in the *battell* & the *Lieutenant Generall* in the *Reere*, being bravely mounted, well armed with their skarfes, and 160. Trumpeters sounding *Tantara* in honour of their prince, and Countrie I leaue it to the report of those, which have seene it.

Also of what excellent use, & service horse maye be off in the day of *battell*, for the breaking of foote, as also vpon *execution*, for the cutting off of *Convoyes*, gayning of *passages*, and the beating in of an *Ennemie* salying out of a Towne *besieged*. I will leaue to the testimonie of *historie*, and here wil I shutt vp this second part.

F I N I S.

F I R S T.
OF THE ORDERING AND FORMING

of a Devision, or a Battalion, and then the forme of an Army of thirty thousand Horse, and Foote ranged in Battell.

THe ordering of a Regiment, according to his highnesse the *Prince of Orange* his command, hath bin shewne already in the first part of this book, namely, that Companies being made into even files, & ten deepe, foure or five Companies, ioyned together make a division, to wit, the Pikes are drawne first into one bodie, and then the Muskettiers into an other, standing in their true distance of three foote in file & Ranke, and 18 foote distance betweene the Pikes & the Muskettiers, this is the first order. The second is, when the Muskettiers are equally devided, as neere as may be, and drawne vp on the right, and left flanks of the Pikes, there to give fire by Rankes, or to march away, as these two first figures marked with number 1 and 2 doe shew.

Now the fittest number of men to make a devision of, is accounted to be 500. Pikes, & Musketteires, that is, 25 files of Pikes, and 25 files of Musketteires, or more, or lesse of the one or of the other, as they fall out.

This number being so embattailed makes an *Agile* bodie, & the best to be brought to fight, and two of them being ioyned neere one an other, can best second, and releiue each other, better then your great *Phalanges*, which are unweeldy bodies, the experience whereof was seene in the Battell of *Nieuport*: for being once broken, & routed, they can hardly be reallyed againe, and cannot bring so many men to Fight, as the Lesser Bodies doe.

Many of these Devisions being drawne together make a *Tercia*, or one of the third parts of an *Armie*, and three of them the whole.

For all the Officers and Souldiers of an *Army*, are devided into three parts called *Brigadoes*, or *Tercias*, each of them having a severall name, to witt, the *Vanguard*, the *Battell*, & the *Reereguard*.

Now that *Tercia*, which is to march first, is called the *Vanguard*, that which marches in the midst the *Battaille*, and that which comes vp last the *Reere*. Everie one of them vpon a march every day takinge their turnes interchangeably: for the second day of the march, the *Battaille* becomes the *Vanguard*, and the *Reere* the second day hath the *Battaille*, and the third day the *Tercia* which had the *Reere* the first day is the *Vanguard*.

Moreover, each *Tercia* may likewise be subdivided into a *Vanguard* a *Battaille* & a *Reere*, to the end each of them with the more convenience may be orderly brought to fight, and by that *Cheife* which commaunds them.

Therefore, the *Battaille* one of the *Tercias* of the *Army*, being placed in the midst, that of the *Vanguard*, may be drawne on the right, and the *Reere* on the left flanke of the *Battaille*.

Now the number of the devisions, which each of these *Tercias* haue, are ordered, and devided after this manner, two devisions before, two in the midst, and two behind, standing about, as you may see in some of the figures of the Battells following, having six or 7 devisions placed in everie *Tercia*. The seventh being vneven, is placed as a Reserve behind the *Reere*, to second the others in time of neede.

The first devisions of the *Tercias* standing in a right line, are to give the first charge, according to the order of their *March*.

The second devisions standing likewise in a right line, makes likewise the second troupes and the third part of the *Battaille*.

Now these devisions are also ordered and ioyned, that if the first should be overcharged and come to give ground, then the second are to come vp, and to releiue the first, yet in such a distance, as they may not hinder one an other in marching by them, but finde place to come vp betwixt the first.

The third devisions are to be placed directly behind the second, in a distance twice as

as the second is from the first, that if it should happen, that the first division should stand behind the second, that then the third might have roome enough, to put it self into good order.

The Horse Troupes are commonly ordered, the one halfe on the right, the other halfe on the left flanke of the divisions, and Battaillons of foote, as the first figure of an Armie demonstrates.

And sometimes there may be *Battaillons* of Horse interlaced, and placed betwixt the intervals, and distances of the Foote, as the ground and necessity may require. For, if an Enemies Horse should be ranged betweene his *Battaillons* of foote, it is needfull then, that the other side should observe the same forme likewise, and have horse to encounter horse, least they should breake in vpon the foote divisions, & so by this meanes they may with the more convenience second, and relieve one an other, otherwise the Foote being overlayd with an Enemies Horse, having not Horse at hand, to charge and second them, might be safely routed and overthrowne, and though and Enemy have not placed Horse betweene their *battaillons* of foote, yet it may easely be done, according to the discretion, and foresight of the Generall. All which shalbe clearly demonstrated to the Eye by figure first in beginning with an Army of six thousand Horse, & 24, thousand foote embattaile'd into three Tercias, with their severall divisions, and afterward I will show the grounds and platformes of the Bataille of *Nieuport in Flanders*, fought (Anno 1609) betweene *Prince Maurice* of famous memorie, & *Albert Arch Duke of Austria*, and then proceede on to represent vnto you the formes of Battailes shown by the Prince of *Orange* abovesaid, & his highnesse brother the Prince of *Orange* that now is till Anno 1635, which may give some satisfaction to those, which are desirous to follow the profession of a Souldier.

*The Demonstration of the figures following,
marked with great A. and B.*

THe two first figures, marked with the figure 1 and 1 are two Divisions of 25 files of pikes a peece, and ten rankes deepe, ranged in Battaille.

The second two figures noted 2. and 2. are two Divisions of muskettiers, consisting also of 25 files a peece, and 10 Rankes deepe as abovesaid.

Now if you are desirous to alter this forme, and divide your Muskettiers into two parts, then you may draw vp 13 files on the right flanke, and 12 files on the left flanke of the Pikes, and giving them their true Intervals and distances for the Muskettiers to fall away, then there are two divisions made of a Regiment, and they stand as is shewed underneath marked with the figure 3.

The figure B represents the forme of an Armie embattaile'd, consisting of 24 Regiments of foote, each Regiment making two divisions of 100 men, and 20 divisions of Horse, Curassiers, and Harquebusers, each division consisting of 300 Horse, making six thousand Horse in all ranged into three Tercias, with the true number of feete, and distances betweene them, as the figures shewes.

Note also, where the gentle Reader sees a P marked within the Division, that signifies Pikes, and the division underneath are muskettiers marked with the Letter M.

To conclude, the Horse are noted in French with C for Cavallerie, and in English with H for Horse.

The figures that are Coloured are distinguished thus. The Pikes with a yellow, the Muskettiers with a green, and the Horse with a red colour.



THE ORDER AND FORME OF QUARTERING and Encamping of an Army.

HAvings howne the figures of Generall *Formes*, and orders of embattailling, ranged inthe wats of the vnited Provinces, vnder the Command of his Excellency *Maurice Prince of Orange* of famous memorie, and his Highnesse *Frederick Henrie Prince of Orange*, our Captaine Generall that now is: I will proceede on and shew how, and in what manner an Armie ought to be encamped, with the sevettall divisions of their quarters, beginning first with a Company of Foote, and Horse, then with a Regiment, and afterward an Armie entrenched, and last of all come to handle *Approches*, and all things depending therevpon, for the besieging and taking in of a Towne or Fortresse: which for the most part, I have translated out of *Mr. Adam Fritsch*, an excellent Mathematician, in his booke printed. Anno 1635.

THE FIRST CHAPTER.

Of three sorts of Campes or Leagers.

THere are three kinde of *Campes*, The first is called in Latine *Castra Temporaria*, that is, A *Campe* which staies not long in a place, but removes and changes euery day: the second *Castra Strataria* a settled Campe, which environeth a Towne, or a Fortresse with intent to take it in, and the third is called *Castra Sustentoria*, a Campe lying vpon a passage, or river to stop and hinder the incursions of an Enemy from getting into a Countrie.

The Campe which dislodgeth euery moment is called Castra Temporanea.

This Campe is also called a *Flying Leager*, hiving no certaine place of abode, but at every motion, is continually to attend an Enemy vpon every remove, and this Armie is to encampe, when the Enemies Armie encampeth, and therefore is called a *Flying Campe*, because it is to hinder the Enemies progresse.

A Campe having a trench cast vp about it, or beset with Turne Pikes and Palissadoes.

Now for a *Campe*, which is ready to remove vpon an instant, we vnderstand that, which takes vp a quarter onely for one night, which forme requires a great deale of wisdome, and circumspection, especially when it is to march, or Quarter not farre from an Enemies Countrie. Therefore, it is very necessarie, that the *Generall* sends out before, a good number of Horse, to view, and informe themselves of the nature, and condition of that place, where the Armie is to Quarter that night, for the accommodation where of, they ought to chuse, as neere as possibly may be, a place situated in a plaine Feld, to which the Armie being come (and that in good time by day, the Quarters shall be made neere vnto the adioyning villages) if there be any and the Horse lodged about them, in places of danger most suspected. A campe may be encompassed with a Trench 4 foot high, and 3 foote broad for their more safety against an Enemy, which otherwise might give an attempt vpon some part of the Armie. The moorish grounds, where is Enemy is not feared, that may be beset with *Turne Pikes*, or with *Palissadoes*, which may be taken vp againe, when the Campe removes.

After the Trenches are in defeece, the Souldiers begins to make their huts of forks, lathes, withes and straw, or for a night onely with sticks and boughes, or such things as they can get, the carriages and waggons laden with Amunition, Materials, and Victuals are to be lodged in the midst of the Campe, with a small trench cast vp round about them; but some peeces of Ordinance are to be planted vpon those *avenues* and passages, where an Enemy may best give on vpon the Campe when the watches, and the Centinels are disposed of, the rest of the Armie goes to take their rest, the next morning at the breake of the day and at drummes beating the Armie dislodges, and every one makes ready for to march

March away, while the trench is a Casting downe, lest an Enemy, which followes the Armie might lodge in the same quarter.

But if the Armie is not to march through an Enemies Countrie, and that one is assured they cannot come neere vnto the Campe so soone it is not necessarie to environ the Campe with trenches, but the Souldiers are either Quatered in houses, or feilds next adioyning to them, in disposing of guards, and Centinels in every place needfull, and this order of march observed everie day, till the Armie is come vnto that place, which is resolved to be beleiged; where then a formall, and a settled quarter called *Castra Strataria* is made.

Castra Strataria and the proprieties thereof.

The propriety of this Campe may be observed well out of the Instructions of *Veget* in the 22 chapter of his fust booke, as also in the *Castrametation* of *Hygnius Gromaticus*, according to these observations following.

First, that the Quarter be made in safe place, that is, where there are no hills and heights, which may commaund and serve as an advantage to an Enemy, when he resolves to relieve the Towne, or Fort beleiged, or to assault the Campe; for being lodged and fortifying himself vpon them, he may easilie overlooke the Campe, and then it is subiect to be played vpon by an Enemies Ordinance.

That it be made (if it be possible) neere vnto some brooke or river, which may commodiously serve, as well, for the watering of Horfe, and Cattell, as also for the Souldiers, and by which, with shipping, or boats one may bring vp Munition with provisions, and Victuals to the Campe, by the helpe of a running river, or the winde for the saving of excessive charges, when one is driven to bring them vp to the Armie by *Convoies*, and waggons, which oftentimes causeth a dearth in the Armie: for commonly Victuals, and Sutlers raises the price of their Victuals, and commodities, according to the length of the way, if they be constrained to bring them vp by waggon hire. Besides, it is a great advantage for a Quarter, to lie by a river side, because sometimes the water may be carryed round about the Campe, which will make it stronger, then if it were lodged in a plaine Feild, and fortified with some small Forts, and Redoubts; so that all that charge is saved in making of workes, if the Campe may commodiously be enclosed about with water. I say nothing of the great stinke, caused by dead Horfe, and beasts, as also by Butchers and their shambles, which like wise is avoyded by the helpe of Water, neither are men so subiect to sickness, and pestilence, which takes away many times a greater number of people, and weakens an Armie more, then if it were assaulted by an Enemy. For, the prevention of which inconvenience, the Carrions, panches and garbidge of Beasts are cast into it, and carryed away with the streame, and the Butchers quartered in the most remote parr of the Campe.

One must also have a speciall care, that there bee no thick-bushes, and woods about it, where an Enemy may lie in *Ambuscado*, or fortifie themselves without any hindrance, which would keepe a Campe in Continuall feare, of being assaulted by an Enemy out of a wood.

To make choise then of the fittest places, to encampe and Quarter in, those are held the most commodious, which are situated in a plaine Feild, seeing an Enemy may be discovered a far off, having then time to draw into Armes, to oppose them, and that the Canon may play vpon them, in case an Enemy would attempt to assault the Campe by force.

As many sicknesses are engendred by stanch, and the putrifaction of the aire: so likewise many are caused by Moorish grounds, *Marrys*, and bogs, in regard of the damps, and fogs, which riseth out of the waters, as also poysonable vapours, arising out of marshie grounds, where vpon the Souldiers hurts are built.

Therefore one ought to be well informed, before a quarter or a campe be made for an Armie, whether those grounds bee covered or overflowed with water, which may often happen in *Autume*, or *Winter*, which were a great annoyance, and hurt to the Campe, if it were driven to stay there all winter, and that one knew not the Condition of the place. Againe, it may serve for some vse to helpe the beleiged, or those which come to relieve the Towne.

Towne; when they may turne the water by some places into the Campe; or can cut some dikes or Seabanques; or keepe vp the water by banks, and sluices; to make it overflow the *Campagne*, which will bring a greater dammage to the Campe, then fire would doe, therefore one ought to consider, and ponder well all these things, and to thinke vpon some remedie to prevent these inconueniences.

One ought also to make choise of such a place, which yeelds good store of grasse, and hay for Cattell, and straw for the accomodation of the Souldiers; because the want of fourrage for Horse, will constraîne them to fetch it farre by conuoyes, which is dangerous for the Souldiers, when an Enemie lies vpon the snap for them, and their Horses in those places, where they are driven to fetch their fourrage, which one is forced to doe with great *Conuoyes*, and excessive expenses. Also there must be care taken, that there bee no want of wood for fying, and building of Souldiers butts, as also straw serving for the same vse.

A Campe ought not to be quartered too neere the Towne Beseiged, lest the Enemie may reach it, and doe great annoyance to it with his Canon, neither ought it to be quartered too farre off, but that one quarter may with expedition relieve one another, as also those which worke in the Approches, if the beseiged should fallie out vpon them, therefore the furthest, and the nearest distance for the better safety of the Campe, is to lie without Canon shot.

The Circumference, measure, greatnesse, and largnesse of a Campe, ought to be answerable to the greatnesse or littlenesse; of it: for one must not take a place too little for a great Armie, neither a place too great for a small Armie: for the one will not be able to defend the Campe, because of the smalnesse of it, and the other not able, and sufficient to defend a great place.

Finally, it is a point of great consequence for a Campe, to have all the *avenues*, and passages that comes to it well guarded, so that an Enemie cannot lodge neare it, to hinder the provisions and Victuals which comes to it, for want where of many times an Armie is forced to rise.

A Campe then being endowed with all these *Proprieties*, no question but it is well settled. But seeing that such places are seldome found, which answers to all these proprieties described above, one must accomodate themselves, according to the propriety of the place, and repaire that by Art, which is wanting by Nature.

If there being any hills, or *heights* in it, you must quarter, and lodge vpon them, when the nature of the place will afford it, or if there be any other commodious place neere vnto the Quarter, it ought to be taken in, and environned with a Trench, and a Redoubt made in it, and Ordinance planted vpon it. But this height being situated vpon a passage, or place of importance, a Fort is made vpon it in taking away, as much as possible may be all advantage from an Enemie.

The seige of the *Bosch* may give vs an exsample herein, where was a height situated vpon the way, as you go to *Vliemen*, and towards the Longstrate, vpon the top of which hill, a fouresquare Fort was made with foure *Demy-Bulwarkes*, and besides a *Groene-Worke* before it, and before that as a surplus, there was made a *Horne-Worke*, all which workes were neverthelesse environned with the line of circumvalation, which encompassed the whole Armie: for the Enemie could hardly assault the Campe on this side, because the hill lay so, that it commanded all the grounds about it.

When there is no River, then all necessities, and provisions must be brought to the Campe by waggon, wherevpon care must be taken, that the waggonmen and Sutlers set not too high a price vpon their provisions, and Victuals, which might cause a Dearth and scarcity in the Army.

For the avoyding of stincks and noisome smells, the dead Carions of horses, and other Beasts ought to be carryed and buried farre off without the camp and quarters, to which order also the Butchers are subiect, for the carrying away of the panches, and Entrailles of the Cattell which they kill, and to bury them in pits without the campe.

The woods, thickers, and groves, which stand not farre from the campe, ought to be taken in within the Trench, when it may conveniently be done with a small charge, which

wood and timber may serve for firing, and other good vses. But when they lie too farre of, and cannot have all within the Compasse of the line of Circumvalation, which may be dammageable to the Campe, then they are cut downe, and burnt, lest an Enemie might lay any *Ambuscadoes* in them.

Also, having a water, or a river, which may be stopped by the Beseiged: so that in time, it might overflow the Campe, one ought to take a singular care by hindring it, and casting vp of some bank to stop, and carry it about the Campe, to discharge it self elsewhere, with necessity, and experience will teach one.

All these things then being maturely considered, and overweighed, after one is well informed of the nature, and condition of the soile, lying about the Towne, or Fortresse, which is to be beseiged, and being come within two or three Dutch miles of that place, the Quartermaster Generall before the Armie rides out with some 80, 100, or a greater number of Horse, as necessity may require, to view the towne, or Fortresse to be beseiged and considers well the soile and grounds that lies about it, and draws a draught and plat-forme of them, that he may the better distribute, and give out the severall Quarters.

All Quarters are not alike over all, and of one and the same forme, but one must accomodate himself many times, according to the fire of the place; for sometimes one must content himself with one Quarter alone, and otherwhiles the Campe may be devided into two, three, foure, or many quarters.

The Forme is also diverse, seing one must governe themselves according to the situation of the place, The largnesse must be answerable to the number of the Regiments, which are to be Quartered, and which shall be handled in the next chapter.

THE



OF ORANGE THE SECOND CHAPTER.

OF THE DEVISION OF HVTS FOR
Officers, Souldiers, and Sutlers.

TOGETHER,

*With the true measure and distances of them, according to his Highnesse the Prince of
Orange his new Order for a Regiment; and for the quartering of the
Captaines in the Reere, for the preventing of fire,
and disorders.*

BEfore wee come to the division of the ground, appointed for the Quartering of a regiment of foote, it will be necessarie to discribe first, how much ground, commonly a Companie of 120, or of a 150 and of 200 heades must haue, which may serue then as a Generall rule in the distribution of the quartering of severall Regiments, containing diverse Colours, and Companies vnder them.

First for a Colours of 120 foote, there is ordayned three hundred foote deepe. But the bredth must be according to the number of the heades in a Company, which are some more some lesse: For a Company of 100, or 120 heads must take vp 24 foote in bredth, that is, two rowes of Huts, and a street betwixt them, a Companie of 150 must haue 40 foote in bredth, to wit, three rowes of huts and two streetes, and a Collonels Companie of 200 heades, requires 56 foote in bredth, that is foure rowes of Huts, and three streetes, besides the back streetes, which are betweene Companie and Company.

As for Example, the *Quartermaster* hath giuen him a *Paralellogramma* of ground, which is 300 foote deepe, and 24 foote broad for a Companie of 120 heades, which he devides thus, from the Lieutenants and Ensignes huts downeward to the Sarians huts in the Reere, of the Sarians hutt, and the boughs of the Captaines hutt: next the Captaine hath allowed him 40 foote in depth and some 20 foote broad (because a passage for the Souldiers must not be stopt vp) for him to build in, Then betweene the Reere of the Captaines, and the Sutlars hutts, there is a large streete of 40 foote made for the passage of men and waggons, and for feare of fyre. And last of all, there is 20 foote allowed for the depth of the Sutlars huts, to wit, ten foote for the forepart of his hutt for eating and drinking in, and 10 foote for his Kirchin, and this is the distribution for a Companie, which must take vp (according to the Princes new order) three hundred foote in depth.

The bredth of a Quarter, is according to the number of the Heades of a Company.

In the depth of 180 foote for the two rowes of huts aboue mentioned, there may be made in each row, twentie or two and twentie Hutts with a distance of two or three foote betweene every Cabin, for the avoyding Eues-droppings and a little trench to receiue the Water made betwixt thim.

The doores of the Lieutenants, and Ensignes Cabbins commonly opens towards the Front, and the Armes, and the Alarme place, but the Sarians towards the Reere.

The Souldiers doores open opposite one to an other, that vpon any occasion they may presently draw out into Armes, all which parts shalbe discribed in the figure for a Regiment (of ten Companies) following.

HIS HIGHNESSE THE PRINCE OF ORANGE
his new Order, and Forme for Quartering of a Regiment of ten
Companies of Foote, to wit, the Colonels being 200,
the Lieutenant Colonels 150, and the
Captaines 120 Heads.

THE DEMONSTRATION.

- A* Is the Colonels Hall, Gallerie, and Pavillion.
 - B* Are two Huts for his servants.
 - C* The Kitchin.
 - D* Two Huts for the Butlar, a Cellar and a pantrie.
 - E* The Stable.
 - F* A place for his Waggon.
 - G* The Captaines Hute.
 - H* The Quartermasters.
 - I* The Preachers Hute.
 - K* The Chirurgians Hut.
 - L* The Lieutenants Huts.
 - M* The Ensignes Huts.
 - N* The Crutch for the Muskets.
 - P* The Crutch for the Pikes.
 - Q* The Alarme place, which is 200 foot between the head
of the Quarter and the Trench.
 - R* The Provost-Marshals Hut and Prison.
 - S* The Svariants Huts.
 - T* The Backstreetes betweene each Companie.
 - V* Is 20 foote between the front and the furthest
side of the Pikes.
- The breadth of the whole quarter for these 10 Companies,
is 430 foote.
- The Coronells division, 84 foote.

THE



THE FORME OF QUARTERING OF A REGIMENT

of Horse, consisting of five Troupes, according to the Prince of ORANGE
his new Order, the Captaines being quartered
in the Reere.

THE THIRD CHAPTER.

FOr everie Cornet of Horse, there is ordayned (as the foote are) a depth of 300 foote; the bredth is not alwaies a like, but must be given according to the greatnesse, and smalnesse of the number of heads, serving vnder the said Cornet.

A Cornet then containing e hundred Horsemen, must have a place of 300 foot deep, and 70 foote broad, wherein they are to lodge, and content themselves.

The Captaines Hutt of the Troupe, with his boughes is 70 foote broad, and 40 foote deep, being a part of the 300 foot abovesaid.

Betweene the Reere of the rowes of the Horsemens Huts, and the Captaines, there is a street of 20 foote, and the two rowes of the Horsemens Huts (as the foot is) is 180 foot deepe, to wit, from the Lieutenants, and Cornets, Huts in the front, to the Quartermasters and Corporals in the Reere, wch makes in all two hundred foote deepe, and 70 foote broad, the room for the Huts in each row is ten foote, after which there is a small streete of 5 foote, in which the Huts have their doores, and commings out. For the Horse there is a space left of ten foote broad, seing that the Cornet consists of no more then of 100 horse, so that there are placed 50 Horse in one row, and 50 in another, and every Horse is allowed 4 foote in bredth, and 10 foote in depth, which is the space also appointed for his Master.

Betweene the Captaines Hut, and the Sutlers, there is also a streete of 40 foote for the same reason, as wee have discribed in the Quartering of foote, after which there is a place for the Sutlers Huts, which is answerable to the breadth of the Cornet 70 foot, and for the depth of his fore Hutt 10 foote, and for his kitchin 10 foote more allowed him, so that the true dimension for the Quartering of a Troupe of 100 Horse, is 300 foote deep, and 70 foote broad.

But a greater Cornet consisting of 140 heads, (or it may be 150) then they have given them a row of Huts more, so that they must have in al three rowes, of which the last standing alone, is separated from the second by a streete of 10 foot, which reacheth from the hutts of the second row, and the Horse are set behind this new row, after which (as before) there is a depth of 10 foote for a Horse, and a small streete of 5 foote, and for the Huts of the Horsemen likewise 10 foot, whence followeth, that the breadth for a Cornet of Horse of 140 heads takes vp 105 foote, for the two rowes takeing vp 70 foot, if you adde therevnto the two streets, the one of 10, and the other of 5 foote, with the distance left, for the Horse, and the Horsemen, making 20 foot, it is in all 35 foote, vpon shall then have the breadth of 105 foot for a Cornet of 140 heads, and the depth of 300 foot as before.

Note that every Horse hath his head standing towards his masters hut, that vpon any occasion his Master may goe directly to his Horse, without going about his hut.

The space being deepe enough for the hutts, they neede not build them close one to another, but leave a little distance of a foote and a halfe, or two foote at the most betweene the Hutts: but betweene every fifth and sixth hut, there is an open space left of some 6 or 8 foote, for the Horsemen to draw out of, if necessity should require.

The Hutts which the Horsemen build, are built in the same manner as the foote are, saving that they take vp more roome, for the depth of the Hutts for the foote, is but 8 foote, and the Horsemen must haue ten.

The two first Hutts in the head of the Quarter is appointed for the *Lieutenants*, & the *Cornets*, and the two last in the Reere are ordayned for the *Quartermasters*, and the *Corporals*.

Before the Horse, (between the Hutts and the streets) there are mangers made for the Horse with boords, or plancks fastned and nailed together, which stand vpon posts driven

into the ground, and have Sailes covered over them, from the one side to the other, and because many Horfe are of such a nature and condition, that they will not stand together, there are posts tyed between them, that they may not strike, and hurt one another.

Now if there be any likelihood, that it may prove a settled Camp, or Leager, then they may also build Huts for their Horfe, to keep them from cold and Sun. These Huts are covered with straw, as the Horsemens are, but are open before and behinde, (because every Horseman may have an eye to his Horfe) so that they are but onely covered over head on both sides, which coverings are also made oftentimes with such Sayles, as Tents are commonly made of.

But the Horfe being come to such a place, are commonly lodged and quartered first in Villages, houses, and barnes, if there be any thereabouts, at leastwise till they have built them huts for themselves, and their Horfe. But finding no Houses, Stables, and Barnes, or such like accommodations for them, then they will be constrained to let their Horses stand uncovered, till they have built their owne Cabins, which being done, then they may make their Horses.

The *Ichographie* of a Quarter for a whole Regiment of Horfe, *Harquebussiers* and *Curassiers*, consisting of five Cornets, each of a hundred heads, shall be demonstrated in the figure following.

THE DEMONSTRATION.

ADrs, is the Colonels, Sarjant Majours, and Captaines Huts, being 70 foot broad, and 40 foot deepe.

Li, and *Cor*, are the Lieutenants and Cornets Huts in the Front of the Quarter.

Qu, and *C*, are the Quartermasters, and Corporals Huts in the Reere of the two rows.

ra, *cg*, a Street of 20 foot, between the Quartermasters, Corporals, and Captaines Huts.

ab, and *gi*, is the depth of 180 foote, for two rows of Huts, from the Lieutenants, and Cornets Huts in the Front, to the Quartermasters and Corporals in the Reere.

ak, *bc*, *pg*, and *hi*, is the breadth of ten foote for the two rows of Huts.

kb, *cd*, *op*, *qh*, is the streets between the Huts, and the stables for the Horfe, being 5 foote.

mn, *ef*, is the great street of 20 foot, for the whole troupe to draw out in.

From *b* to *r*, is a large street of 40 foot, for feare of fire, between the Reere of the Captaines Hut, and the Front of the Suttlers.

Cn, is the Suttlers Huts, that is, 10 foot for the forepart, and 10 foot for the afterpart for their Kitchins.

Note, that a Colonell of Horfe is allowed no more ground, then a Captaine of a troupe is, onely this preheminencie he hath, to be quartered in the midst, and if his troupe be stronger, then a private Captaine is, then (as is above said) he is allowed him more ground, and another row of huts, and thus much for the Quartering of a Regiment of Horfe,



Of Particular Quarters.

Besides, the Quarters aboue mentioned, there are also Particular Quarters in a *Campe*, which ought to come into consideration, to wit, The *Generals*, The *Generall of the Ordinance*, the Quarter for the Canon, Carriages, and waggons, as also some other Quarters, which shall be described as followeth.

The *Generall* hath a square place of Ground giuen him, which as a Regiment is 300 foote deepe, and 600 foote broad, and his Tents and Pivillions sett vp, and disposed of as the *Generall*, and his *Tent-master* shall thinke fitting.

Also there is giuen to the *Generall of the Ordinance*, a depth of 300 foote, and a bredth of 480 foote for him, and his traine of Ordinance, Officers, and Handie crafts men to Quarter in, hauing a little trench cast round about it.

In which ground also, is built a foure square Redoubt with haire cloth ouer it, to laye in powder, and Fireworkes, for feare of fying, and to keepe them from wetnesse, and rayne seing they are not so combustibile and will not take fire so soone, as straw, or sailles will.

There is also a place ordayned of 300 foote in bredth, and depth for some chiefe Officers of the feild, which are not lodged within the Regiments.

The waggons also have a certaine place giuen them, that they may give noe hindrance to the *Campe*. The depth is also commonly 300 foote, but the bredth must be answerable to the number of waggons.

The *Market place*, where Marchands, Victulars, Tradsmen, Butchers, and Bakers are lodged have a depth also of 300 foote giuen them, and is some 400 foote broad, in the midst whereof there is an open place left for the market place, and the sides are divided into rowes of hutts and streetes. They make ordinarily eight rowes of hutts, whereof foure are sett upon the one, and foure vpon the other side, every hutt being ten foote broad, and betweene every two rowes of hutts, there is a streete left some 20 foote broad.

The first two Rowes of hutts next to the market place, are appointed for *Mercers*, wollen and linaen Drapers, and some other choise wares. The *Tavernes*, and *Ordinaries* takes up the second, the third are for handicrafts men, and fourth for Butchers, and Bakers.

There is likewise a vacant place left for the lodging of *Voluntiers* and *Strangers*, which hath noe certaine measure, but must fall out, sometimes more and sometimes lesse as occasion serves, and this is the description of a quarter, or *Campe*, both in generall and particular, as nere as may.

THE FOURTH CHAPTER.

THe *Quartermaster Generall* makes first a Scale, which will serue for a sheete of paper, fitting it according to the proportion, as the said paper will beare, either greater or lesser, and then makes a draught vpon it. According to the measure of his Scale, he drawes out vpon this, some *parallell* lines of 300 foote deepe, which shewes the depth of every quarter, with some other *parallell* lines of some 50, 80, or 90 foote, as the ground will afford, and the diuisions betweene Regiment and Regiment.

Afterwards he marketh vpon a paper, euery one of the said quarters, and Regiments a part, according to the proportion of the same scale, as one hath drawne the lines aboue said, and then cut it off so that they haue all one depth of 300 foote, and the bredth according to the list of the number of the Companies of every Regiment, and how many foote every Regiment and quarter will take up. It were better to take a peece of past board paper & then make & cut out also vpon the said paper, the depth the bredth, and the name of the Regiment the Colonell and person to whome the quarter belongs; doing the like in all the other quarters. These little papers being so cut and ordered, one may put and lay them again vpon the paper with the *parallell* lines abouesaid, euen till they be laid according to your desire, and let them be as they are fitted. One must nevertheless have a care, that the Generals quarters be in the midst, and that there bee a convenient space without his quarter, as well before, as on both sides, as the figure following will shewe marked with the letter A, where the Generall is lodged in the midst of the Campe, and the bredth of his quarter, according to this scale is 1250 foote, and the depth as is said 300.

The quarters are separated one from an other by streetes, and diuisions some lesse some more, as the ground will give it, as some will 500, otherwhils 80, 92, or 100 foote betweene quarter and quarter, as you may see in the figure following.

Finally the *Quartermaster Generall* takes first the bredth and depth of the whole quarter, and Campe, and draws it out (as is taught) vpon a paper. The bredth here takes up 3000 foote and the depth 2000.

The draught of the campe being drawne vpon a paper, and the whole quarter designed, it will be easie then to lay them out in the field.

*How one must marke and lay
out the quarters in a field.*

To this end, the *Quartermaster Generall* hath a chaine divided into *Rhyn-landish* foote & Rodds at 12 foot the rodd, & an instrument vsed in fortification, or at least a wodden crosse with foure right angles, and a good number of Beacons with banroles vpon them, called *Quarter beacons*, whereof the statues are painted, and are some nine, or ten foote long, and sets vp one of these angles of every quarter.

Being come into the field, in which he is resolved to encampe the Army, first he layes out the circuit of the Generall quarter, with foure exterior lines in such sort, that every corner of the quarter makes a right angle.

After one hath measured out the foure lines abouesaid, he sets vp foure quarter Beacons, and then begins to lay out every quarter a part, according to the proportion, which he hath marked in this paper: but to the end one may not err, he puts vpon the little cut paper the number of every quarter, with which also the Beacons are marked, by which meanes the same quarter is bounded in the field, and the number is painted, or cut vpon the Beacons. It will not be amisse, to have alwayes foure of them of one number, which may easely be known by the Beacons, in case they were all of one coulour. All which is demonstrated in the figure of a Campe where the Beacons are set up, and noted with the figures 1, 2, 3, & 4.

The duty of a Quartermaster of a Regiment.

After all this is done, and every particular quarter drawne out in the feild, every quartermaster distributes the ground to the Companies of his Regiment, according to the *Lehnographie* of the figure of 10 Companies showne before for a Regiment; In laying out of his quarter, he vseth a line of 300 foote long and every eight foote is marked for the depth, and bredth of the huts and streets, sticking downe into the ground at every eighth foote a bough, or stick, as well in the front as in the reere of the quarter, giving also to the Colonell his ground in the midst of his regiment. But first the Quartermasters pikes out the ground before and behinde for the Captaines, & gives there the bredth of the streete between the Sarjants in the reere of the souldiers huts, and their owne as likewise the depth, betweene the Captaines boughs the Sutlers huts, marking out first the fouré angles of his quarter, by setting into the ground his quarter staues and flaggs of his Colonels colours.

The duty of a Sarjant.

THe quarter being so laid out, then the Sarjant of every Companie killspits it, and divides and makes the partition of the huts to the Gentlemen and souldiers, which they prick out by line and small boughs, or sticks stock into the ground, and so divides the rowes of huts and the streets among them, every hut having some 4 or 5 foote in bredth, and for vniformity sake 8 foote deepe, and thus the ground for a whole Regiment of what number soever the Companies be, is marked and drawne out in a feild, as the figure of a Regiment for 10 Companies before mentioned demonstrates.

The other quarters to wit, for horse, officers, ordinance, and carriages are marked by number and letter in the campe following.

The Alarme place.

THere is left round about the circuit of the whole quarter, a *parallell* on all sides some 200, or 250 foote betweene the front of the quarter and the trench, called an *Alarme Place*, for the souldiers to draw out into Armes, into *Parade*, or when any *Alarme* or commotion happens, the *Campe* or quarter being environned with a Trench, and a Parapet of six foote high, six foote deepe and three foote in the bottome, and the ditch 8 foote broad.

The souldiers of every Companie are commonly commanded to make this trench, parapet, and ditch before their quarter, or where it may fall out, because it serues for their own defence, which the souldiers are to doe, for their owne safety, without giuing them any mony for it.

There is assigned by the Quartermasters to every Regiment, how much ground they must cast vp, according to the commission and strength of every company, which proportionally is equally divided among the companies, that one companie do no more work then an other. In doing of which, the Captaine and Officers of a companie are to ouersee it, that the trench be done well and with expedition. Now the whole circumference of the quarter, being measured out by line, and *killspitted*, there is a generall *calculation* made, how many Regiments there are in the campe, and how many companies each Regiment hath, that one may know how many hundred companies there are in the army. And then by the rule of 3 (knowing the line and circumference) and the number of companies, say, the number of all the Regiments, and Compagnies which are to make up the line of *Circumvallation*, amounts to so many feete, or rodes, how much ground then must a Regiment of ten companies haue that containes so many men. This *calculation* being made, the companies of every Regiment draw out so many men, after the Quartermaster hath furnished them with materials, which is quickly done, seing the men are relieved, and many hands (as the proverbe is) makes light worke, and will make hast, that they may haue time to build their own huts and cabins to keepe them vnder covert.

The quarters being thus fortified, and the line of *Circumvallation* made a double ditch for horses and strong *Redoubts*, *Horne-works*, *Crowne-works*, *Batteries*, *Half-moones* and

Spurs upon the commanding places of most danger (as you shall see in the *Ichnographies* of the lines of Circumvallation before the siege of the *Bosch*, *Mastrick* and *Breda* which shall be shown (God willing) in my third part of this booke, all these things then being done, after the demonstration of this Campe, we come next to handle approaches.

THE DEMONSTRATION OF THE severall Quarters in this Campe.

- A** Is his Excellencies quarter, which is 300 foote in depth and 125 in bredth.
- B** Is the Lords the States quarter being 300 foote in depth and 342 in bredth.
- C** The Generall of the ordinance and Magazin 300 foote in depth and 800 in bredth.
- D** The quarter of the Carriages and Waggon.
- E** The quarter for Marchants, Tradesman and Victulars.
- F** Monf. Chastillon quarter being 14 Companies making 28 Rowes of Huts 300 deepe and 500 foote broad.
- G** Monf. Bythunes being 13 Comp. making 28 Rowes 300 foote deepe and 500 in bredth.
- H** The Freefes being 5 Comp. making 15 Rowes 300 foote deepe and 235 foote broad.
- I** Sir Horace Veres Regiment being 14 English Comp. making 31 Rowes 300 foote deepe and 548 broad.
- K** Monf. Cicils Reg. being 7 Comp. making 15 Rowes 300 foote deepe and 292 broad.
- L** Colonel Ogles Reg. being 8 Comp. making 16 Rowes 300 foote deepe and 308 broad.
- M** Monf. Fulchs being 6 Comp. 18 rowes 300 foote deep, and 300 broad.
- N** My Lord of Bach-louch being 6 comp. 12 rowes 300 foote deepe and 244 broad.
- O** Colonel Egmont his Reg. being 6 comp. 12 rowes 300 foote deep 244 broad.
- P** 7 comp. Wallons commanded by Count Iohn Ernest 14 rowes 300 foote deepe and 276 broad.
- Q** Count Ernest Lord Marshall 10 Comp. 25 rowes 300 foote deep and 450 foote broad.
- R** 6 Comp. of Hollanders 12 rowes 300 foote deep and 242 broad.
- T** Prince Henry Generall of the Horse 4 Cornets 300 foote deep and 476 broad.
- V** Capt. Qwicht 3 Cornets 300 foote deepe and 250 broad.
- W** Monf. Market Lieut. Generall 4 Cornets 300 foote deep and 340 broad.
- X** Monf. Ryhoven 4 Cornets 300 foote deep and 340 broad.
- Y** Monf. Bacx 4 Cornets 300 foote deep and 340 broad.
- Z** Monf. Wagheman 3 Cornets 300 foote deepe and 253 broad.
- aa** Monf. Quet 3 Cornets 333 foote deep and 350 broad.
- bb** Monf. la Sale 4 Cornets 330 foote deep and 340 broad.
- cc** Monf. Stakenbrouck 4 Cornets 300 foote deepe and 340 broad.
- dd** The Droff Sallant 4 Cornets 300 foote deep and 340 broad.
- ee** Peter Parry commanding the Princes guard of Horse 2 Corn. 300 foote deep and 100 broad.



OF ALL MANNER OF APPROCHES, AND

their Profiles, with the definition what approches are.

THE FIFTH CHAPTER.

THe Approach by which one approacheth safest towards a Towne, or a Fortresse besieged, are certaine hollow ditches, called *Trenches* digged into the Earth, whereby one may approach neare vnto a Towne, or a fortresse covertly, without any great harme, if the lines be carryed well, and kept from the sight of an enemy.

In approaching one ought to consider well; 1. *The situation of the Towne or fort to be besieged.* 2. *The propriety and forme of the approach.* 3. *The beginning and distance of them, and fourthly their profile.*

1. For the Site of the place, one ought to consider well the propriety, and nature thereof, whether the ground bee high, low, hilly, or plaine. In plaine and even ground, one may finde foure kinds of Earth, to wit, 1. a Clayie & a solid Earth, 2. Sandie, 3. a Spongie and rotten earth, & 4. moorish and a marchie ground which may bee covered & lie vnder water, hauing no firme foundation to work vpon. Secondly, hilly places whether they have a solid foundation, 3. Sandie, and 4. Stonie. Also one must take into consideration the Forrests, woods, wayes, ditches, hills, and such like things, as may lye round about it, or go towards it.

Of foure wanner of Approches.

First, if one can not make choise of such ground as they desire, then one must take it as it falls out, whence there follows diuerse manner of Approches; for if it be good ground, then they run their lines directly from the left hand to the right, & from the right hand to the left, continuing it *alternatively* till you come to your distance desired, the half of which trench is digged into the Earth, & the other halfe cast vp with a *parapet* raised vpon it, which serves as a blinde to keep your men from the sight of an enemy, and thus you continue your approach by windings and turnings, till you come to the *Counterscharfe*, and moate of the Towne besieged, and this kinde of approach you vse in good and firme Earth.

The second kinde of Approach is that, which is made in a *Sandie ground*, which you may run in the same manner with windings, and turnings as you did the first, saving that your *parapet* will not hold with sand, and therefore, because Sand is not so good to work vpon, and will not lie so firme as other Earth doth, but will cost more labour, and require more time then solid Earth, therefore one must approach neerer and neerer by setting vp of Gabions.

The third way hath another difference, then those two aboue mentioned, for sometimes one may finde good Earth, and Sandie mingled together, yea, and somewhiles a *Marras* on both sides, in so much that one shall haue but a narrow way, through which one is to carry his approach, and as in the former you cannot run your lines from the left hand to the right, or from the right hand to the left, so in this you are driven to run a line directly vpon the Towne or Fortresse besieged.

Now this manner of approach carried in a right line, is not so labour some & chargeable as the others before-named, which are run with *oblique lines*: but the greatest labour is, such an Approach must be made deeper, then the former, & do require a double trench & *parapet*, whereas the others haue but a single one, and ever and anon there must be blinds sett vp because this kinde is more dangerous, and in this approach the one half of the Earth is sett vp with a parapet on the one side, and the other half on the other side.

The Approach which is made through moorish, and marchie grounds overflowne, is almost impossible, by reason of the inconstancie of the water, which riseth, and falleth according to the season, and which causeth many inconveniences: for when one expects dry

wether

season, the weather may alter and proue rainie and stormie, which may not onely hinder the approach begun, but also fill the trenches with water, therefore in such cases, one must accommodare themselves, according to the weather, and vse the wisdom, & experience of Ingeniers herein, for the preuenting of these inconveniences.

As the half of an ordinarie approach, is digged into the ground, so the other half is cast vpon ground: this kinde being made over water and *Marras*, having no firme foundation, the foundation of them is layd by filling vp the water with bundles of Boughs, Brulh, faggots, & such like things, hauing Earth cast vpon them, to settle them, & make them lie fast, & the Earth being brought vpon wheelebarrowes from some other place, a *parapet* is raised, and blinds sett vp, that the workemen, & Souldiers may work and be in more safety, which guards it.

The fourth difference of approach, is also made by Earth brought from some other places, having *Fagots*, *Brush*, *Bavins*, and planches layd vpon it, with *parapets* and blinds sett vp.

Fifthly, having want of good Earth, and finding great store of Sand, then the parapet must be made with *Gabions*, and Cannon Baskets filled with Earth.

The sixth & last manner taketh its originall from the former, & is made with Redoubts in ioyning the one to the other.

And if your meete with a stonie place, then you must help your self with *Gabions*, & fetch your Earth from some other place, as you did in marchie grounds.

These are all the severall kindes of Approches, that we have mentioned here in this Chapter, which one cannot make without difference and judgement, because the one is more laborious, and dangerous then the other, as we have taught.

But to the end all inconveniences may be avoided, one must first informe himself well the nature of the place, through which one is resolved to run an approach, & take a speciall care, that no error and faults be committed through ignorance, which may loose time expence and labour, and may crosse the happy successie of an Armie, for it were an absurd thing, of one should make that approach in a moorish ground, which is to bee made in a plaine place, where there is good Earth, where one hath elbow room, and space enough to run oblique lines, or whe one would make them above the ground, when there is Earth enough to be digged out of the ground and cast vp.

Besides, one ought to consider well, the distance of the first breaking of ground, between it and the Towne or Fortresse to be approached to, that one begins not too neere, nor too farre off, for the beginning of the Approches being too farre from the Fortresse, one looses both time and paines, when one begins to breake ground from a place which is in safety.

On the other side, to begin an approach within the sight of an Ennemie, one cannot so well defende himself from musket shott, because the Muskettiers may take a surer marke, then when they shoot at *Randum*, and it will be hurt for the workmen, before they can gett into the ground, besides the workemen cannot be so well seconded, and relieved without great danger, especially if the besieged sallies out, and gives them hurt *Alarmes*, so that they must be presently, relived, or else they will be driven to quit the approaches and to retire, if they be not seconded betimes.

The distances betweene the beginning of an Approach, and a Fortresse.

Hence one may clearly vnderstand, the distance of the Approach to the Towne or Fortresse besieged, and the place where one begins to breake ground first, ought to be as farre, as a musket can well carry from the outworks of the Fortresse, which may be about some 90, 80, 70, or 60 rod at 12 foote the rodd, or as the nature of the place wil afoord it.

*The beginning of an Approch.
or first breaking of Ground.*

When one would begin an Approch, there must be choise made of 200, 300, 400, or 500 lusty souldiers, which are vsed to work, now besides the ordinairies armes, which they carrie, they take downe alōg with them into the approches spades, shovells, pickaxes, and others materials necessary for work, and are set in order by the Ingenier in that place, where the Approch begins, & to the end they may begin with the more safety, they have diverse guards of Foote, and horse standing up and down, here and there to defend them, if the besieged should fallly out vpon the workemen, and because they may make a good beginning, first they cast vp a Redoubt or two, from whence the trench & approach is run, which are environned with a parapet, & a good ditch, & the sides of the redouts made some eight rods square, as you may see in the profile of trenches.

Indeed, sometimes as occasion may serve, they make demy Bulwarkes, or it may bee Whole Bulwarkes, for which one takes a Profile answerable to the greatnesse, for when they are litle one makes vse onely of the Profile of ordinarie trenches, and when they are great thier Profile must be likewise correspondent vnto them.

These workes and Redouts serve for a Retreat to the workemen, if an Enemy should make a great sallie vpon them: for being retreated into the said Redouts, they may resist an Enemy, and stopp them, till they are seconded, so that such Redouts are very necessary. For if the workemen had not a place to retreat into, they would be forced to betake themselves to their heeles, and to abandon and loose their worke.

But the Ingeniers which are employed therein, ought to vse all the skill, industrie, and experience they have to run their lines in such a sort, that those which are in the trenches and approches may not be discovered and seen by an ennemy. In a word, they may runne their approches with the more safety, and as much expedition as possible bee towards the place, or part of the Fortresse, which de Generall desires to become master off.

There are two principall parts in a Town or Fortress, one of which must be battered, if one is resolved to take it in, and that is, either a Curtaine, or a Bulwarke.

What part of a Fortresse ought to be approached to.

IT is not good to approach to a Curtaine, which is defended by the two next Bulwarkes, and their flankes, when you are to expect an enemies Canon continually on both sides of you, especially, when you would give an assault vpon it; for afterward it may easely be cut off. Besides that the moate is broader before the Curtaine, thē in other places whence it followeth manifestly, that there is no advantage in approaching vpon such a place.

But a Bulwarke is the safest, & best to be approached to and taken in: my reasons are these first the moate is not so broad and large, as it is before the Curtaine, & a Bulwarke hath but a single defence, coming from the Bulwark opposite to it, which may be better beaten vpon by Batteries then the Curtaine can. Moreover, a Bulwarke hath but a little defence of it self, because on may be forced to retire from it, & to make new workes, & cuttings of behinde that part which is quitted. And because there is no so much space, as is within the curtaine, the fortification there of is more painefull, and more incommodious, & therefore it is better to approach to wards Bulwarkes, then curtaines, which is found by practize, and daily experience.

There are other works belonging to a Town, or Fortresse, as (Crown-works, Hoorn-works, Tenailles, Ravelings, Halfe-moones, and others. The manner of carrying of approches wil be cleare and easie enough, when wee come to shew an approach by figure vpon a Towne or Fortresse which is to be taken in.

After one hath naturely resolved, whether he will run an Approch vpon a Curtaine, or a Bulwarke. The Ingenier being prefet at the breaking of the ground, is to shew & informe the workemen well, how they are to run their line, and as necessity requires, being of diverse lengths, but most commoly some 20, or 40 rod long, or sometimes shorter or longer

and broken and turned as often as is necessary. The line then being laid out, & marked they divide and place the Workemen in order, that they may not hinder one another.

Now they give to every man the length of foure or five foote, and every one maketh as much hast as possible may bee, to gett into the ground, for the avoyding of the danger wherevnto he is exposed, while he stands vpon the open feild, therefore the Earth, which he diggeth he casteth it vp before him, and with all expedition maketh a hole like a graue: it is needlesse that at the first breaking, the ditch should be any broader or deeper then three foot, for the Earth being cast vp three foote about the Ground, and the ditch likewise three foote deepe, a man then hath covert enough.

The Workemen then being got into the Ground, they enlarge and deepen the Approches as necessity requires, but those which are fardest off from the Towne, they need not be soo deepe at the beginning, as when they come neerer to the Fortresse. The bredth of the Approches ought to be some 10 or 12 foote broad, as may be found necessarie: yea, sometyme one is constrained to make them larger, least they might be too narrow, in regard waggons may be driuen through them, with materialls necessarie for the Gallerie, as also Canon which must be drawne downe, and mounted vpon the Batteries.

But by how much larger the Approches are made, by so much ought the parapet of the Trench to be heightned, that the Enemy may not discover the Souldiers that are in them.

Especially one ought to heighten those points, and windings, where the Line turnes, otherwise it may proue very hurtfull and dangerous.

While the Souldiers are busied in making of the Line, others are employed in making of a Batterie, to hinder the Enemy from Sallying out.

When the night is past, there are fresh workemen sent downe to relieve the first, and to enlarge, heighten and repaire that nights worke, vnlesse some of them are willing to continue their worke, and these commanded men, are to have ten stivers a peece, which the Quartermaster of every Regiment, who delivers the materials doth sollicite for, and payes them.

After the first nights worke (or it may be the same) there are *Corps de guard* made, to putt a good number of Souldiers into, where they keepe their *Maine guard*, which are made sometimes within the lines, with which the *Corps de guard* ought to be *Parallels*, or else vpon the point where the line turnes, and sometimes without the Approches, to which the *Corps de guard* are ioyned to them by a line of *Communication*: so that they lie three or 4 Rod from them.

It is not alwaies needfull that these Redoubts be made square, but one may make them *long-wise*, or else with 5 *Angles*, and after diverse other manners, as the Ground will best afford.

Most commonly one workes by night, that they may receiue the lesse harme, and that the day following the worke may be repaired.

When one line is finished as abovesaid, and that it must be run no further that way, the *Inginier* turnes the line another way, (bearing it from the Towne or Fortresse) and placeth the Workemen in order as abovesaid, in continuing so by windings, and turnings. till he hath gott something neere vnto the Fortresse besieged, and making good the Line continually with *Corps de guards* and Batteries.

But the neerer they approach vnto the Fortresse, the more subject they are to danger, so that their pay is encreased every day, as the Approach is advanced, seeing they hazard their liues for it, they haue a halfe Rixdaller a night, sometimes a whole Rixdaller other-whiles a Rixdaller and a halfe, yea sometimes ten Rixdallers for an howers worke, if it be very dangerous.

Finally when you are approched with your trench so farre, that you are continually in the fight of an Enemy, & where you cannot get any more ground, but with great danger, they make use then with an other manner of digging, or an Approach called commonly a *Sapp*, which is made in this manner following.

When a resolution is taken, to approach vnto a *Curtaine*, or a *Bulwarke*, you run a right line

line upon that place, which you intend to assault: as for example, suppose it were upon the *Demiface* of a Bulwark, in such sort, that it lies without the flanking blowes of the Fortresse.

A man then kneeling upon his knees, digs to get into the Ground, and casts up the Earth before him on both sides, with a short spade, towards that part of the Fortresse, till he hath digged three foote into the Ground, and that he is covered with the Earth, casting alwaies the Earth like a moald before him towards the Towne, and on that side, where the most danger lies, he ought to cast up the Earth so high that it may be able to shelter those, which comes to repaire and make the Sapp larger. After the first man which makes the Sapp is got into the ground and covered with earth, he advanceth forward and continues the Sapp, till he hath got some six foot, and then follows another Sapper presently, who repaires and enlargeth the ditch to the bredth of six foot, while the other advances forward three foote further in bredth and got so deep, that he is alwaies covered with the Earth, which he casts up before him, and the other follows him continually enlarging the ditch from three foot to six. After him comes a third man, which finishes the whole Sapp, and gives it the convenient height, depth, and bredth answerable to the first approach. But one must have a singular care, that the approaches and Sapps bee not digged so deepe, as that water may rise in them, but that they may alwaies remain dry upon firme ground, which the condition of the ditch wil shew it: For when the water within is very deep, and the declinatiō high enough, one may make the Approches as deepe as the ditch, when the water that is in it, is distant from the plain Earth.

Touching the manner of Working, an Agreement is made with certaine worke-men, because a greater number of worke-men cannot worke in so narrow a passage, they take on five or six worke-men, and give them 4, 5, 6, yea, sometimes more as six-dallers apeece, as they can agree with them, and as the danger is little, or great.

In this manner of work, being come so neer for the safeguard of the Muskettiers, which are to give fire, there are *muskett baskets* set up vpon the top of the Parapet of the approaches, close one to another filled with Sand or Earth, between which the Muskettiers puts out the noses of their muskets, to give fire upon the besieged.

And because the Approches, the neerer you come to the Fortresse are made much deeper then at the first breaking of ground, there are one or two foote Bankes made for the souldiers to mount up upon, and to discharge their muskets or firelocks.

As for example, the figure following numbred 153, is the part of a Towne or Fortresse upon which wee are to run our approaches, and that upon firme and good ground.

The First Example.

For as much as the Fortresse is environed with a *Corridor* or a *Counterscharfe*, one must not take the distance from the great Rampart, but from the *Counterscharfe*, and begin the Approches some 90 rods distance from the *Corridor*, because one may with the more safety put the spade into the Earth. Therefore one beginneth the first line of approach from the letter A, and runs it to the letter B, being some 30 rods long or thereabouts. The beginning of the line is fortified with a Redoubt marked with the letter C, into which the workmen (if the besieged should fall out) may make their retreat, and into which also the guards for the workmen may retire. The first line turneth at B, taking its beginning neere unto the Corps de guard D, and runs to E, being some 30 rods in length, where an other Redoubt is made marked with the letter F, to hold a guard in it, and because it might be dangerous to run this line any further, it turneth from F to G, and from G to H, where another Corps de guard is made. For the neerer you approach unto the Fortresse, the more the approaches must be strengthened with guards and batteries. Besides the Approches there ought to be made deeper, and higher, because you come neerer the Enemies, Canon, and his Musket shott, which may shoot the surer upon you, here then you begin to set up Musket baskets, and make foot-bankes to your Approches, that the Souldiers may gett up to them when they are commanded to give fire.

K

When

When one is approached so neere by meanes of these turnings and traverses that the remainder may be run with a long Traverse, then one begins to Sapp from H to I, from which also one may make another line to approach unto the other side of the same Bulwarke, or also the other Bulwarke, as the line from I to K, shews. Behinde theselines the Muskettiers gets up allwaies to discover, and shoot at those that would peepe into them.

There are likewise two Redoubts made on both sides for guards, as the letters N and O, do show.

In the *Interim* a Sapp is begun, that runneth towards the Bulwark, which one is resolved to mine in, and which is made in the same manner, as we have described above, when you sapt into the Counterscharfe, and that you are come to the brinke of the Moate, then you are to fill and damme it up, and to make a gallerie, and blinds which wee will treat of when wee come to speak of a Gallerie.

While you are busied about making your approaches, diverse batteries are made here and there, which serve partly to spoile the Ramparts and partly to dismount and hinder the Enemies Canon from playing upon you, and to keepe the besieged in awe, that the workmen may worke with the more safety, as you see by these fixe Batteries noted in the figure 153, and thus much for Approches upon good ground.

Wee have divided the approaches, which run in a right line into three sorts: The first is in a narrow way, an earth which may be spitted out somewhat deepe, and yet neverthelesse without turnings and Traverses: The other is when you cannot digge into the earth, but there is, or you shall have water presently, as hapneth in low and moorish grounds.

The Second Example.

When you are to approach unto a Fortresse in a right line, and that the nature of the way through which you are to carrie your approaches, is of such a condition, that you cannot digg into the earth with spades, then you must do as is showne in the figure 154, where they are covered with earth both on sides, & are made a little deeper then ordinary Approches. Now seeing the danger is greater in this kind, then in the first, and that a right line causeth you to be continually in the sight of an Enemy, you must prevent, and avoid that danger by making of blindes, which are either made of bundles of rife, or brush, or with thick oaken planckes foure or five ynches thick, and as in this figure you may see, for what use they serve.

The third Example.

There where one cannot digg, as in Marras and moorish places, a foundation must be made with sinkers, that is bundles of boughs bound fast together, upon which (as is said) earth is cast. Upon this foundation one makes Traverses and Blinds with *Gabions* as you may see in the figure 155.

These *Gabions* are also filled with earth and made so strong, that they are Canon prooffe, one may sett up also a double row of *Gabions*, which sometimes have earth cast about them.

The bredth of such Approches is from 4 to 8 rod, as the place is narrow or broad, and as necessity and danger requires, but the Ordinarie bredth is no more but four or five rod. One must have also a care, that one Traverse endeth there where another beginneth, to witt, there where an alley is left.

The like manner of Approches were made at the seige of the *Bosch* on Count *Ernest* his side, to which as being a new found-worke, it got a new name, and was called the *Grease Gallerie*.

This manner of Approach may be used also in a stonie ground, where one cannot digg the earth because of stones.



The Fourth Example.

Againe you meete sometimes with a foundatiō, which one cannot passe through *dryshod*, and cannot get deepe enough into the Earth, but one is forced to approach in that manner as is represented in the figure 156 in taking the neereſt way, which may be to approach unto the Fortrefſe, and the Approches is made of that Earth, which is digged about it, in ſtead of ſetting up of *Gabions*, and as in the former Approches the traverſes, and blinds were made of *Gabions*, ſo here they are made with whole Redoubts: in the miſt whereof there is a gape or a Sallie, made in ſuch ſort, that the one Redoubt is joyned to the other, the greatneſſe of every Redoubt, being ſome ſix or eight Foote in length, and as much in bredth.

Such Traverſes are oftentimes made ſo ſtrong, that they are able to reſiſt a Canon-bullett when they have Earth enough, for ſometimes they are made ſix foote, but the heighth of them is not alwayes alike, ſeeing they muſt bee made higher there, where moſt danger is.

The gates are made in ſuch ſort with a falling plancke, that they may bee drawne up, and ſhut, and are of that height, and bredth, that a waggon may come through them.

It is a thing impoſſible to deſcribe all the manner of approaches, becauſe they are ſo mixed and of ſuch great diverſity.

Neither is the ordinary way of approaches alwayes a like, becauſe the one are made deeper, and larger then an other: but commonly they are from 8 to 14 foote broad, and three or 4 foote deep in the earth, or thereabouts: the *Baſis* of the earth layd upon it, in ſtead of a parapet, ought to be betweene ſeven and eight foote.

We have propounded as an example for them two *Profiles*, marked with the numbers 157, and 158, whereof the greatneſſe, & meaſure of them, is noted with letters and numbers in this table following:

THE DEMONSTRATION.

FIGURE.

The Profile of the Figure marked.	157	158
The inferior bredth of the Approach.	AB 9	12
The depth of the Approches.	FB, HA 3	4
The Talud or Slooping exterior.	FD, 1 $\frac{1}{2}$	2
The Talud inferior of the Approches.	CE, $\frac{1}{2}$	1
The Bredth of the Approches above the Earth.	CD, 11	15
The Baſis of the Parapet above the Earth.	LC, 8	10
The Talud exterior of the parapet.	KL, 1 $\frac{1}{2}$	2
The Talud interior of the parapet.	GC, $\frac{1}{2}$	1
The height exterior and interior of the parapet.	IK, GH 3	4
The Top of the parapet.	HI, 6	7

We have expreſſy omitted the foot-banks, becauſe they are not made in the beginning of the Approches, which ought to bee made in the Approches after diverſes maners ſometimes this way, and ſometimes many as occaſion may ſerve.

OF COUNTER-APPROCHES.

THE SIXTH CHAPTER.

THE *Beseigers* having approached neere unto a Towne or a Fort, it behoves then the beseiged to look well about them, and not to be idle, but stirring, and to doe their uttermost endeavour to hinder, and offend their Enemy.

The defence which is made against these Approches is rightly called Counter Approches.

This defence also is made after diverse manners, first when the Beseiged are a great number, so that oftentimes they are able to fall out, and make Sallies, which they ought to do as often as may be, notwithstanding that they loose men, which of necessity must happen, because the Beseigers are much more stronger then the Beseiged, and have farre more forces, then those which are within the Fortresse.

For by this meanes the Enemy will be hindred, and his Approches slowly advanced, being many times beaten back, and constrained to retyre into his workes, during which *Alarme*, they cannot advance forward their workes, neither can they begin them againe, till the Beseiged are retreated.

They ought to have a singular care, when one makes a Sally, that their men be not exposed to slaughter, but must be commanded to fall on with discretion, advantage, and profit, to the end that the Towne or Fort beseiged be not bereft of their men by foole-hardinesse, rashnesse, and imprudencie.

For a Fortresse which wants men, may bee compared to an empty purse which hath no money in it. It lies much upon the endeavour of the Horse, which are in Fortresses, for making of Sallies, and which ought to fall out oftner then the Foote, because they can fall on and retreat with more speede, and though some be lost, yet the hurt will not be so great, as the losse of foote, which must be husbanded, and spared as much as possible may be, to repulse the assault of an Enemy.

The second manner of defence is made by *Canon*, which must play continually from all places upon the workemen and Approches, to doe them as much harme as possible may be, whence it comes to passe, that the Workemen are amazed and frightened, when they see many of their fellow workemen fall and slaine miserably by the Canon, which will abate their courage, and make them worke more faintly: in such sort, that an Enemy is driven to leave of their worke, till such time as the offensive side have made Batteries, against the Beseiged.

But when it is not feisible, they must be constrained at last to breake up, and quit the siege, otherwise if they continue, it wilbe exceeding chargeable to them, because no men will undertake the work, but such as wil be soundly payed for it.

For every man hazards his life, when Ordinance and Musketiers play continually upon him, and a man will not venter his life for nothing, but will sell it at as deare a rate as he can: besides in so doing, it prolongs the time for an Enemy, so that a Fortresse may sometimes be relieved, or when Winter, or bad weather comes on, they may be forced to abandon the Siege.

The third manner is by making of all sorts of *Outworkes*, and in takeing up the Ground, whereunto an Enemy Approches, which may be made during the siege, and while an Enemy Approches, as by making of *Ravelings*, *Halfe-moones*, *Horne-workes*, *Tenailles*, and *Traverses*: for all these workes may be made, while an Enemy advances his Approches towards a Towne or Fortresse, but it were better they had bin made before the Towne was beseiged, for the gaining of time, and saving of charges, which might be employed in other works.

The fourth maner is when the Beseiged make Counter Approches, whereby they may resist an enemy that he may not get into the Outworkes and Counterscharfe with his approaches, where to hinder him, they must cast up some Traverses, and other lines running them
from

from their outworks, as it were to meet the Enemies works, and so make them get ground (as it were by peece-meale) till they come to the Fortresse : But neverthelesse one must observe well, that they must be carryed and made so, that they may alwaies flank upon the Beseigers works, and approches, and that the Approchers may do them as little harme as may be, alwaies making them so, that they lie open towards the Towne or Fort Beseiged: from whence they are to be defended, and must be so carried, that they may give no advantage to an Enemy, when he takes them in, and see that they may be flanked from the Town and Fort both with Canon and Musket.

At the last seige of *Bergen op Zoom*, there were many such Counter Approches made, wherewith the Beseiged gauled the Enemy shrewdly, insomuch that he was not able (notwithstanding the losse of abundance of men) to get a foot of ground of them, having chests in the Counter-Approches which played continually with muskettiers and firelocks upon the Enemy, and casting fireworks among them, taking up also the ground and advantageous places before the Enemy could approach unto them, which did disharten them much, for assoon as Prince *Maurice* of happy memory, came to *Rosendale* with his Army to relieve the Towne, *Marquis Spinola* seeing no hopes of getting it, after the losse of twelve thousand men, was driven to rise without it, and quit the seige.

OF ALL SORTS OF BRIDGES, ESPECIALLY,
your flagg, or Bulrush Bridges.

THE SEVENTH CHAPTER.

UPON an expedition of warre, when of necessity an Army is to passe over a River, or a Brook, there are commonly carryed Boates, or sloopes upon Waggons, as hath been taught before, having Beames, or Boards, all necessities laid in the Boates to be used, first they take downe the Beames and Posts, and then the Plancks, and Boards, which is done in a trice, when all things lie in order, sometimes they carry onely Boats, and sometimes onely plancks. To make then a Bridge over a River, first these Boats (as many as you shall have use off to lay over the River) are launced into the water, which are bound together with ropes, and fastened with Cables and Ankors in the bottome over, which sparres and beames are laid, and then plancks and bords layd orderly upon them, for men to march over. There are likewise such kind of bridges made with great boates in Fortresses lying upon a river side, when an enemy is feared, and where one dares not make any other bridge for it is drawn up every night like a draw-bridge, that if an Enemy had any enterprise upon that place, he might not passe over it.

There are made likewise bridges over the moates of the outworkes of a Fortresse: but an Enemy being approached neere unto the Fortresse having made batteries to beate them down, these bridges are broken down in the outworkes, and fally bridges made, to which they cannot do much harme, for the making of which, one takes some Barrels, or Hoggs-heads bound about with iron, and pitched, unto which rings of iron are made fast for to put posts into them, by which meanes these Barrels are ioyned together, and lockt one to another, upon which there are laid planckes for men to passe over and repasse, and if one would take them up in the night, they do it in such a manner, that they are soon sundred one from another. An Enemy cannot so easily spoile such a Bridge, because it lies even with the water, and if one part of it should be shot a peece, one may presenly help it againe, with other Barrels and posts.

There is an other kind of Bridge, over which one may give an assault, whereof some of them are borne upon waggons, and others upon boats, and are made after the manner of *Draw-bridges*, saving that they are lighter, and are drawn upon the waggons, or boats upon which they are laid, but when one is to use them, then they must take them downe. Read the Treasury of the *Mechanick Secrets* of *Augustine de Ramely*: The Artillery of *Diego Vffano*, and the Theater of the instruments of *Henry Leyssing*, which treat of these things at large.

But of all Bridges none are found more necessary and usefull then those that are made of flaggs and Bulrushes. For all others require great charges, especially when some Ingenier takes some old invention from an ancient Author, and gives it out for a new one: for it is reason such a one should be recompenced, because of his invention, and afterward becomes a directour for the making of it, as though no other could be made, but that which he hath invented, and so by this meanes makes his benefit of it, and his count and reckoning according to his desire, by making a bridge at such a high rate and charge, that makes his masters purse light, and his owne heavy. But if you looke narrowly upon it, you shall find it to be an old invention, as one cast off, and serves for no use. The like doth happen here, for when you consider well many new invented Bridges, made with great skill and industry, yet nevertheless they serve for little or no use. But your bridges made with flaggs, or bulrushes, are nothing so chargeable, and yet nevertheless of great use: we will shew here in few words, how they are, and in what manner to be made.

The matter whereof they are made, are called in Dutch *Biesen*, in French a *Jonc*, in Latine *Juncus*, and in English a *Bulrush*. This rush groweth in Rivers, waters, Brookes, some foure, five or six foot high, and is commonly found in brook pits Marras, and wet places, especially by Rivers sides, whereof also many times houses are tharcht. The nature of this bulrush is to float above the water, and are used (being bound up in a bundle) when boyes learne first to swimme, putting them under their arme-pits.

This Bridge above mentioned is made with this rush after this manner following, when they are ripe and growne to their length, then they must be plucked up, and well dried, and when you would make such a Bridge, you must bind up these Bullrushes in round bundles, or foure square, whereof the sides must be some ten inches broad, and about foure or five foot long.

Now having got good store of them, one makes a hurdle of them, enterlaced with small withs, 5 foot broad, and 7. or 8. foot long: Upon this hurdle one layes and binds in order the bundles, one after an other, and afterward one takes two long stakes, a little greater then a pike, which is fastened to the hurdle, drawing and binding these bundles fast one to another, which are likewise bound with canvas, at the end of the hurdles one fastens at both ends two or three rings made with withs, to joyne and fasten the joynctures of this bridge together.

These kind of Bridges are of excellent use in Seiges. chiefly in places where one is resolved to take in a worke upon a suddain enterprise, and would not be at the charge of making a Gallery.

When one is resolved to take in such a work, those which are appointed to force it, being well armed as is requisite, being come to the brink of the moate by the meanes of the Approches, which are brought thether, they send out before some venterous Souldiers, which carrying this bridge launces it into the water, and joynes the peeces together withall expedition (and while the musketeirs gives fire as fast as ever they can) till they have laid it over the bredth of the moat, and fastened it on the other side, which being done, the Souldiers goes over it, and strives to enter by all meanes to take in the work, as they are commanded.

But if there be any mine made ready, they stay the putting over of the Bridge, and the falling on, till the mine be sprung, for feare of breaking the Bridge, and that it might spring backward.

When the besieged are resolved to make a sally, they may likewise make use of these kind of Bridges, all other commodities and utilities, necessity the mother of such like inventions will shew you.

Now for the better understanding of all things touching these bridges above described, we have represented them in the figure 159. where you shall see how they are made fast, on that side which is to come into the water.

But they are too weak, where you are to put over a broad moat, such as are before Townes and Royall Forts, over which one must passe, before they can come to the Wall, for these serve

serve onely for some suddaine peece of service, and therefore it is needfull to make use of some other invention called a Gallery, which is of excellent use though chargeable, and which we will handle in the next chapter following.

OF GALLERIES.

THE SEVENTH CHAPTER.

V*Egecius* in the 16. chapter of his fourth book, describeth a certain kind of work, which the Ancients called *Vinea*, and saith it was a work made of plancks ioyned together, some eight foot high, seven foot broad, and sixteen foot long, the rooffe or toppe whereof was covered with boards, and hurdles interlaced together, and the sides with Boughes, in such wise that it could not be spoyled with stones, over which also was laid thick Oxen hydes, newly killed, or coverlids of hair cloth, to keepe them from firing, (whence it hapneth, that we make use of such coverings in our moderne warres, for to hinder the force and violence of Gun-powder, because they are not so easly spoyled by fire (as hath bin said above) and these workes being in a readinesse, one makes use of them to their advantage.

When they have made good store of them, then they joyne and fasten them together, and the Beseigers being blinded and covered under them, begin their approches to the walls and sapp under the foundation of them to make them fall.

There is no work which resembles more rightly this invention of the Ancients, then our moderne Galleries: The preparation, the use, the height, the breadth, are almost all alike, and do agree so together in all things, that we must needs confesse our Gallery is no new invention, but was in use among the Ancients, and which of late yeares hath bin renewed again.

For if one considers neerly their structure, the *Vinea* of the Ancients was made with timber and plancks, and our Galleries for the most part are made with postes and plancks joyned together: That had also posts to rest upon for its foundation, and this hath also great posts to beare up the weight of the whole work: The sides of the Ancients *Vinea* was fortified against the force of the Balists, because they were laid with hurdles and boughs, wreathed together, but our Galleries are covered with plancks, and earth cast upon them, so that they cannot be spoyled by Canon: The *Vineas* were kept from firing by the helpe of Oxen hides wherewith they were covered, and the sides of our Galleries have earth cast about them, that fire-works may do them no harme.

These *Vineas* served to come to the wall, to sapp it, but our Galleries are brought to the Basis and Barme of a Rampart, to make a mine in a Bulwarke, and so to blow it up.

The hight and breadth of the one and the other do not differ much, but it seemes the length is differing, though in effect it differs not much; For the *Vinea* the joynts of them being fastned one to another were reasonable long, but our Galleries are set up with plancks and postes and as it were makes but one peece joyned together.

Whence it appeareth, that our Gallery is not wholly a new invention, but hath been in use of old, though in some things it is altered and changed.

We will now take it in hand, and shew after what manner it must be made, with all the appurtenances thereunto belonging.

When an approach then is brought so far, where a Sap is to begin not far from the Town or Fortresse beseiged, and that one is sapped to the Counterscharfe, then one sees how a Gallery may be put over the moate. For the effecting whereof, one must make provision of many things necessary thereunto, and first of all get good store of longbrush and bundles of boughs, to fill up the moate, with a great number of plancks and postes ioyned and made together like a Gallows, all of them having one height and bredth, which are so framed and made by the Carpenters before they are brought down into the Approaches, that

one may either take them asunder, or pin them together without any great labour, for being brought thither, where they are to be used: It is easily done by marking the joynts and peeces with one and the same number which they may fit, and joyne together without any great difficulty.

Such a Gallowes hath five peeces, to wit, two posts which stand upright, one crossewise over them, which ioynes the other two together, and two props or supporters of timber to bear the crosse post up, the two posts are set upright being 8 or 9 foot long, and are cut halfe a foote in the upper end of them, for the crosse beame, or post to rest upon the other two posts, and to iojne them together, and a foot and a halfe at the lower end is sharpened and set fast into the Ground, so that it remaines seven foot high for the top of the Gallery. Yo shall see the forme of it set out in the 160 figure following, whereof the length of them from *a b* to *c d* are each of them 9. foot long, and the bredth 6. or 7. inches, the halfe of this breadth at the uppermost end of these two posts is cut the length of halfe a foot, to lay the crosse beame upon them, which ought to be cut in the like manner, having the length of ten foot, or thereabouts, for the longer this crosse post is, the broader will the Gallery be, and the better for the souldiers to march five or fixe in front, when they are to give an assault upon the breach, the greatnesse is answerable to the two others, being marked with *A G*. Now forasmuch as these posts are made in such a manner with joynts that they may soone be joined together or severed, they cannot be so firme as those which are joined and pinned fast together by force, without being afterwards taken asunder, especially, because of the great weight which they are to beare, therefore there are props made to support the crosse post, as you may see by *E. F.* and *G. H.* marked in the 160. figure, all which being done, and all the peeces joined and pinned fast together as is fitting, every peece is marked, and holes bored through them to fasten them together in a little time, when there is occasion to have them set up.

Of the Bords and Planks for a Gallery.

After this you must provide in a readinesse good store of Fir boards and plancks, which must be as long as the two posts, or rather four or five inches longer, so that if the distance between post and post be 5 foote broad, then these plancks must be five foote, and a halfe long: for the odd half foot is divided into two equall parts, taking up three inches on either side of the two posts, into which holes are bored, to naile the plancks and the posts fast together.

The ordinary space between the posts joyned together is commonly 4. or 5. (but seldom) six foot in bredth, which oftentimes is changed according to the condition of the place, and as the danger is great or little.

The thicknesse of the plancks is without any certain measure, because it is needlesse to make them all of one thicknesse, for it may so fall out, that sometimes you must use a thick planck, and some whiles a thinner is fitter to stop a hole withall, as occasion may serve.

Now for the joyning and fastening of your posts together, you must provide good store of oaken pins, and bore all the holes with a borer, to the end the holes may not cleave, now all these pins ought to be of one bignesse.

Also in Galleries there are used nailes some greater and longer, as you shall have use for, some of them are 4. or 5. inches long for to naile the plancks with, which covers the sides: some other 6. or 7. inches long, which nailes the props into the posts, you must have good store of them of all sifes for to use them, when necessity shall require. Your ordinary wheelbarrowes and shovels are here of excellent use, but you must have shovels that have longer hafts then ordinary, to cast the earth a good way into the moate, which cannot be so well done with short hafts.

In this place one ought to make use of thick plank-blinds, which we have mentioned in the chapter of gabions and blinds, which serve for a very good use in Galleries, as we shall show you hereafter.

A Gallery



A Gallerie raised without, being covered with Earth, is represented unto you in the 161 figure.

After you have sapt through the Counterfcharfe, and that you are come to the edge or brinke of the moate, and resolve to lay a Gallerie over it, you must first of all provide good store of these bundles of long brush before mentioned, brought downe in waggons, and abundance of wheele-barrowes, to fetch Earth into the Gallerie, to cast these things into the moat, and to fill it up, even to that place, where you intend to make a *Mine*, and in so doing, you shall by degrees fill up the moate, and make a good foundation for your Gallerie to rest and stand upon.

But because any cannot cast and lay these bush-faggots in order, as one would, you shall meet with some venturous souldier or another, who for money will adventure in the night to goe out at the mouth of the Gallerie into the moate, to lay them in order. And to the end they may not be seen by the Enemy, one must observe well to make the *perpendicular* of the face of the Bulwarke, which will be the shortest way to come unto it.

The moate then being filled with these long bundles, and fagots of Brush abovesaid, so that one may cast Earth upon them brought from the next sap, the work-men fetches good store of Earth in wheel-barrowes upon plancks laid in the Gallerie, and brings it to the mouth of the Gallerie, casts it upon a heape and then two or three workemen which are appointed to worke in the mouth of the Gallerie, casts it into the moate to settle the fagotts.

This Earth cast up in the forme of a heape, serves to cover and make a blinde for the work-men onely before, but not on the sides, and therefore they must be constrained to make blinds on that side which is most dangerous, til the posts be set up, yea oftentimes they must make blinds on both sides of the Gallerie, if an Enemy flanks it from two places. After this one begins to set up one of the posts, ioyned and pinned together as hath been taught, and as you may see in the 160 figure. And sets some men continually to fetch Earth in their wheele-barrowes, others from the top of the heape casts the Earth with their Tongues shovels into the moate, and gets more ground to set up the other post, for having got a matter of five foot or thereabouts, they sett up the other post ioyned together as is said, after they have set forward the blinds for to cover the sides of it: which two posts being set up, then they naile the plancks fast to both sides of the Gallerie. and they set onely the others upon it without fastning them by covering the side onely with Earth, which may be beaten downe by the Enemy, till it is able to resist a Canon bullet, and then casts Earth above the Gallerie, about a foote or a foote and a halfe high, which must be spread, and laid even, to the end, fireworks may not lie upon it, and spoile the Gallerie by fying of it.

It happens sometimes, that one side of the Gallerie is out of the Enemies sight, and cannot be beaten downe with their Canon, in such sort that one needs not cover it with Earth and then that time and charge is saved, unlesse it lies so, that an Enemy can sett fire on it with pitch ropes and other fire workes, or spoyle it with his Canon, which lies in his *Out-workes*, which being so, then of necessity, you must cover that side, till it is able to resist the Enemies Canon.

And because it would be very darke if the whole Gallerie were covered with Earth, and so very incommodious for the workmen, therefore to helpe that on the safest side, there are little windowes or holes made of a foote high, and a foot and a halfe long, betweene every three or foure postes ioyned together, to give light into the Gallerie.

This work is continually advanced, and the heape raised by the workmen, which cast the Earth into the moate in a great quantity before them, having alwaies a singular care, that the heape from whence they cast their Earth growes not too low, least the workmen be discovered. Afterward they sett up the third posts ioyned together in the same manner as hath been said, and make fast the boards, and planks to them, this labour must be continued till the Gallerie is advanced even to the very foote and barme of the *Rampard*.

All which is shown in the 162 figure where a Gallerie is made & covered, as also to show that one of the posts ioyned and sett up, which must be nailed to the other with planks, and the heape of earth behinde, which the man stands and works is also here portrayed out.

M

When

When the Gallerie is brought over almost to the very foote of the Rampart, then one may come to it with more safety, for then the heape is taken away, and a blinde made of thick oaken planks to begin a mine into the Bulwarke.

At the lower end of these posts abovesaid, as you may see from B to D, there is an other post besides of the same greatnesse, which cannot be scene, therefore wee have purposely omitted it, but will remember to speake of it, when we handle the making of the posts and palisadoes.

THE EIGHTH CHAPTER.

OF MINES.

AS a Gallery is an ancient invention, so likewise Mines, which we make at this day have been heretofore in use amongst the *Ancients* also: And this is the last thing where-with the besieged are troubled.

A Mine then according to the definition of *Vegetius*, is a Cave by which one makes secret goings under the Earth, to come by night unawares to a Fortresse, or by which one diggeth into the foundation, and bowels of a wall, or of a Bulwark, underpropping the earth with posts of wood, and laying under it dry wood, for when they would make a hole in the wall, they set fire on this wood, which being burnt with the props, the wall fell down, and the Besiegers being in a readinesse attending the fall of the wall, ran presently up by that breach, to assault the Fortresse: which is understood also of our moderne Mines which we make in by blowing up the powder that is laid in them, whence it appeareth clearly, that this is also an ancient invention, being a little changed, and amended at this day.

This mincing (or digging under the earth) is called in Latine *Cuniculus*, of which name ancient Writers, as *Iulius Caesar*, *Livius*, and *Curtius* make often mention of in the description of this *Stratagem*, it signifieth a Moole from whence the name is taken, because the Mines made under *Ramparts* and *Bulwarks*, resembles the holes and passages which Mooles makes under the earth. There are others which derive this name from the Latine word *Cuneus*, because the Mines are made in the fashion of a *Wedge*, which is thick at the beginning, and diminisheth little by little, even as the Mines which make a rupture in those places where they are made, may be compared to a wedge, which cleaveth a piece of timber in sunder. Mines were of old called *Cuniculary*. He that is desirous to know more thereof, let him read *Vegetius* and *Vitrueve*, who have written of Military inventions among the ancients.

We will here describe in a few words, how our *moderne Mines* are made at this day.

The last meanes for the forcing of an Enemy besieged, to make him yeeld, is this making of a Cave or Mine under the earth, which is begun and finished (as is said) after you have brought your *Gallerie* over to the *Barme*, or foot of a *Rampart* or *Bulwark*.

But before it is begun, you must have all things necessary, and in a readinesse, for the effecting of this work, first of all ye must have Spades, Shovels, Pickaxes, and all kinde of *Masons* tooles, with all things requisite to pierce and break the Wall, wherewith the *Rampart* is made.

Afterward, one prepares props to support, and beare up the Mine from falling or sinking, being two, or two inches and a halfe thick, the length of them being not alike, because the entrance into the Mine is made higher then towards the end of it. One is furnished also with firre planks, for to line the Mine vvithin, as above, that it may not sink and fall down, for it must be set with planks on all sides, as vvell as the foundation, especially if the earth be moulding and vvertish.

But before you begin to make your Mine, it vvill be necessary that you know the condition

tion of the place, that is, whether the Bulwark be hollow and vaulted, or whether the foundation be laid with Branchages, Logs, or borne up with Piles: and whither water may not spoile your Mine, if you should mine too low. In case that the Rampard or the Bulwark into which you intend to mine, were laid with logs, or supported upon great Piles, which happens ordinarily in moorish and rotten places, upon which you must build your Bulworks, and Rampards; or when one can get no other Earth but sand: you must trie and get out all these Piles with Cables or ropes, by winding them out with an instrument ordained for this purpose. Now you must pierce and pull out these logs by such wayes and meanes as is known unto Miners, for the making of a way and a chamber to lay your Gunpowder in. When you are assured that you cannot digge no deeper, but that shall come to water, then you must raise your Mine a little higher, to the end the powder may lie drie in it.

The Miners then beginning to break into the wall, do carry their Mine so close, and secret as possible may be, that the Besieged may not heare any noise, or gather any notice, where the mine is made, and how it runs: for if they doe, without all question, they will make a *Counter-mine* to discover and spoile your Mine begun, so that you shall be driven to begin a new one in another place, as hath happened many times.

The heighth, and the bredth of the Mine must be made in such a manner, as you may onely lay in the Barrells of powder, for it ought to be no higher, nor no broader, because your intentiō is, but onely to chamber your powder in it, and therefore it must needs be so high as a man, and no higher, but that a man may onely work in that upon his knees, and that he stoops lower, when he goes to lay the Powder into its chamber.

The heighth then must be but 4, or 4 foot and a half high at the most, and the bredth but 3 and a half, or foure foot, according to vvhich measures, the props and the planks are framed, vvherevvith you are to underprop the Mine.

When you begin to mine into a Rampard or Bulwark, you take out the earth, and carry it away in a vessell, or a pail of leather, which is light, in handing it one to another, till it be brought out of the hole, or entrance out of the Mine, and laid in the Gallerie, to the end the Enemy may not see it, and gesse where abouts your Mine is.

The *Master-miner*, which hath the conducting of the Mine, ought to be a man of great experience, how he ought to carry it, lest he be mistaken, and so make it in a place, where he ought not to make it. Therefore he must have knowledge of a *Compass*, and how the needle stands, that he may carry his Mine aright. He ought also to have skill in *Geometry*, to the end he may know of what heighth he must carry his Mine, according to the proportion of the Rampart.

The nearer he comes unto the place where he is to make his Chamber, the narrower ought the way of the mine to be, in such sort, that it must be no broader or higher at the entrance into the Chamber, but that a Barrell of powder may scarcely passe through the way for the straighter and the narrower the passage is into the Chamber, the easier the Mine is stopt.

The place where the Chamber is, ought to be so made, that the powder doth not break neither the one, nor the other side, but that it may blow the earth upward. Nevertheless sometimes the Miners are commanded, to make their Mine so, as it may blow the earth into the Fortresse, or else without which may be done, if they make that side, which is to be blown up, not so thick as the other: for the nature of powder is such, that it maketh the greatest operation alwaies towards the weakest place, and though it blows it up ordinarily: yet commonly it searcheth most often the place, where it may break out soonest in to the ayre, which appeareth both in your Canon and Muskets.

The bignesse of the Chamber is divers, for it must be made according to the greatnesse and proportion of the wall or Rampard: nevertheless one must observe, that it be made as narrow as possible may be, and yet must have room enough to lay the Barrells of powder into it: the ordinary heighth is some six or seven foot, and the bredth foure or five foot.

When the Chamber is ready, then you lay in your Barrells, the number whereof cannot be so precisely discribed. For one Rampard is greater then an other, in so much, that a greater

ter quantity of powder is requisite more for one place then an other. The common opinion is, that a Barrel of powder will blow up a rod, or twelve foot of Earth. The Barrells are laid in such order, that in the twinkling of an Eye, they take fire all at one time, which causeth a greater operation, then if one Barrell should be blowne up one after another. After that your powder is chambred, the with all expedition you must stop the entrance into the chamber, with thick and strong planckes, and stopp it hard, and ramme it in with good Earth, and leaue a little hole or traine, to lay some powder in it, which traine is carried to the very end of the mine, and stops up the passage of it with firkins of Earth, that the aire may neither come in or out. For the stronger the Mine is stoppt, it will take the greater effect. All things then being in a readinesse, it is left so till one is commaunded to give fire to it.

In the 163 figure is represented unto you a myne marked, *A B C D E*, is the way upon the Bulwark, *E* is the entrance into the chamber, *F G H* and *I*, is the chamber it self, wherein the powder is laid.

Here a question might be moued, whether mines ought to be carried with right lines, or crooked? The answer is, that mines, which are carried in a right line are sooner made, but because they take not so good effect, the other are to be preferred before them, which are made with oblique lines. For the windings and the turnings of them, adds strength unto them, that the powder hath not so much force to break the stopping. Now suppose that it should break the stopping *D: E*: the rest therefore is not broken, because the force of the powder is kept in by the Earth marked *D*, and driven back to blow upwards, or finding no vent to turne back againe, where it was laid. But in a right line vvhhen the powder breaks the stopping, the effect thereof is hindred and deminished, for it is certaine, that the stopping, which is made newly is not so firme as the old settled Earth, vvhich hath lain a long time in it.

O F

OF COUNTERMINES

THE NINTH CHAPTER.

WHere there is an *Offensive* Warre, there is also a *Defensive*, as appeareth by minest for the Beseiged having discovered them, vvhich one hath prepared for them, and that there is no hope left, but vvaiting for the Springing of an Enemies myne in their Rampard, and to giue them an assault, then they are to stand upon their defence, and beginn to make mines also, vvhich they eyther doe to offend an Enemy, or to defend themselves by them. Therefore vvee must understand here, three kinds of mines to vvite, the vvorkes vvhich are made to finde out an Enemies mine, 2 : The Countermines, vvhich are made to spoyle an Enemies mine, & 3 the cutting off of a Bulvarke or a Rampard vvithin, of the vvwo former, vvee will treat in this Chapter.

For the first kind of Countermines, vvee understand those vvorkes, and mines, vvhich are made to discover, and finde out an Enemies Mine, and to kill the miners in it.

After one hath found it out, as also for the casting down of the same vvork, and the taking avvay of the povvder chambred, the Enemy vvill finde himself deceived, vvhen he thinks to spring his Mine, attending the operation thereof in vaine, because the povvder is stolne out of it.

For to finde out an Enemies mine, there are vvwo manner of vvayes, the one vvhich vvvas used by the *Ancients*, and the other practised at this day.

Vitruvius in the said Chapter of his tenth book, describeth the maner of the *Ancients*, and saith that the Cite of *Apollonia*, being besieged, and the Beseigers having made some Mines under the earth to assault the Citizens, on a sudden vvithin the vvalls, the Citizens being advertised thereof, vvvere extremely affrighted thereat, and began to faint and lose their courage: because they knew no remedy to prevent it, and could by no means finde out the place vvhere the Mines vvwere made. But *Trypho Alexandrin*, vvhich lived in that age, the *Architector* of this City, caused to be made along under the vvalls a great many ditches, and vvithall some Mines under the vvalls continuing them beyond the Enemies, as farre as one could throw a stone. He caused to be hanged in these ditches vessels of Copper, under these places, vvwhere the Enemy vvrought, vvhich made a noise, by reason of the moving of the earth, vvwhereupon he found out the Enemies Mines, and filled Cauldrons of brasse full of boyling water, and melted pitch, to povvre it down through those holes upon the heads of his Enemies mines. He cast down also mens dung, vvhich vvvas mixed vvith hot sand and gravell, vvhich he did by night into the Enemies Mines, into vvhich he had made divers holes, and by this meanes slew a great many of them.

Herodotus in his *Melpomina* makes mention of a *Tinker*, vvhich dvvelt in the City of *Barca*, besieged by the *Persians*, vvho discovered the Enemies Mines by the meanes of a Buckler of Brasse, vvhich he hung in divers places against the vvall, and so found out at last the place under vvhich the Enemy mined.

But at this day to finde out an Enemies Mine, they use to make counter-ditches, as hath been said, and before a Mine is begun, it is necessary to be informed, after the manner of the *Ancients* of the place, vvhich may be undermined by an Enemy. But Mines are searched out after divers other vvayes.

Some are of the opinion, that round about the vvalls, and Bulvarks of a Tovvn or a Fortresse, (to vvite, vvhen the fortification is first begun) one should make hiddē caves, and passages under the earth, by vvhich one might discover, and finde out an Enemies mine. But this me thinks is not good, because the vvalls and Bulvarks are made thereby slender & vvveake, and these caves & being made vvith posts, and planks, vaults in tract of time are subject to rot, and & the Mines afterward falling down, all that labour is lost. Also it is dangerous to make vaults in Rampards, and Bulwarks, seeing it is to be feared, that such a work is not durable, sith it must bear up so great and ponderous a vveight, besides it vvill cost excessive expences. And though these Counter-mines should be thus made and

ordained: yet it is not certaine, but that an Enemy in myning may meet iust with one of these Mines, and so take his way and advantage, either over or under it, and so leare this Counter-mine alone.

A second opinion is this, & some findes it good, that one should hang trees, and other bushes in them, which are found often in the Rampards of the *Cimbri*, which being stirred with the least motion, gives a sound, whereby one may finde out the place where the mine is. But this is a thing uncertain, because the least gale of wind, will easily shake these bushes, and branches of trees. And if they do so this must be done in a still and a calme vweather, vwhen there is no vvinde stirring. And therefore I answer, one ought to search out an Enemies mine at all times, for it vv ere an absurd thing, for one to stay from finding an Enemies mine out & till a calme time comes, vvho vvill advance (as much as possible may be) his vvork, vvithout staying for still or faire vweather. Therefore this vvay serves but for little use.

A third and a better vvay, and which is the ordinary way, is to set a drum in the place suspected, vvith some Dice, pease, or beanes vpon the head of it, vvich upon any stirring, will leap upon the drum, vvhen it stands over the place vvhere one vvorks. Nevertheless you must not let it stand in one place onely, but remove it novv and then from one place to another, yea so often, till you are assured of the place, vvich is shaken by the work vvich is made under it. Some make use of a Bason of litany filled vvith water, and imagines, that the mine is there, vvhere the water moverh, but that is uncertaine as that of the *Cimbri* is, spoken of before, but that of a drum is held to be the best and surest way. Notvvithstanding one may make good use of Basons, vvhen they are set vpon a *Rampard*, as a drum with peas or other things. For by such a meanes one may knowv the place, vvich is undermined. The use of Basons vvithout all question, took its Originall from the Invention of a Kettle, vvhereof vvee haue spoken even novv.

A fourth opinion besides these vvich is in use also; is a great long iron Borer, to bore into the Earth, vvherevvith those vvich searched the Earth, bores a hole vvith it into the *Rampard*, & laying his eare to the hole to listen well if he can heare any noize, vvich is practised in suspected places. Many other Inventions are invented by necessity the mother of practise.

To resist then the mines of an Enemy, one makes use of this practise following. After you haue curiously searched out the Enemies mines, and that you are assured of the place under vvich they are hid then you may find them out vvithout all question, & nothing remaynes then, but to make a *Counter-mine* against them, vvich is made in the same manner as vve haue described in the former chapter, treating of mines, to vvith, by underpropping the Earth vvith posts and laying planks betveene them, that the Earth may not tumble dovv n. Now because one is not assured to meed iust vvith the Enemies myne vvich may be made either too high, or too low, therefore you must make many, till by one of them you haue found it out, & are come to the *Chamber* to take avvay the powder.

When an Enemies myne is carryed so secret, and hidden, that one cannot finde it out, then the besieged must of necessity resolve to quit that part of the *Rampard* or Bulwarke under vvich they suspect there is a mine, and so cut it off invv ardly. But for their advantage they make ready also their *Countermine* made in that place, & chambers their powder attending the effect of the Enemies mine, and vvhen he springs his mine, then they retire themselves into their nev vvorke cut off, and the Enemy being lodged in that peece of the Bulvvarke or Rampart, vvich they haue quitted, then they blowv up their *Countermine*, and slay all those, vvich they find in it.

The like also is done in outvvorkes, and Counterskarfes, vvhen one is driven to quit them, and that one cannot keep them any longer.

OF PALISADOES, PALES, TURNE-PIKES,
BARRICADOES, QUADRANT-TAN-
TERNAILES: AND BEARES.

THE TENTH CHAPTER.

WE haue often made mention of *Palisadoes* and the use of them, especially vvhhen they are struck into the ground about dry moates, for then they serue, in stead of vwater against the sudden assault of an Enemy, so that not onely the moates before great valls, and Rampards, ought to be set with them, but also all Outworkes must be fortified vvith them.

They are likewise of excellent use in the Field, vvhen trenches are set round vvith them, and struck in round about Forts, and vvorkes, vvwhich lie in the most dangerous places.

They are of no lesse use also in Fortresses, especially vvhen the Besieged are constrained to make cuttings off vvithin a towne, or Fort: moreover they are good to be struck in upon the topp of Breaches, vvwhereof vve vvill treat in the next chapter.

These *Palisadoes* then are made in this manner follovvving, one makes choise of good and strong *Sparrs* being some 3 or 4 ynches in *Diameter*, but of severall lengths, according to the place into vvwhich they are to be struck, vvwhereof some of them may be 5, 6, or 7 foote long. Nowv the lower end of them must be sharpened and pointed, and the upper end flatt, that they may be driven into the ground vvith a mallet or a beetle: one bores also a hole some 3 or 4 ynches under the head of the *Palisadoe*, & an other some thre ynches under the first hole, and a third hole on the side through the middest of the tvvo others, in such sort, that the nailes, vvwhich are driven through it, resemble as it vvere the corners. In some also they use to driue in tvvo nailes, so that they are not struck in a right *Angle*, but rises a little tovwards the head of the *Palisadoe*. The length of these nailes, must be some eight or tvvelue ynches, and so bigg, that they cannot be easely bowed or broken, and the Head vvwhich is driven into the *Palisadoe* is some vvhat greater, then that vvwhich sticks out, vvwhich ought to be very sharpe.

When you are to use these *Sparrs*, vvwhereof you must haue good store, you take first of the shortest size, being but five foot long, and strick in a long ranke of them, as you shall finde necessaric. They are driven into the ground the depth of a foot and a half, or sometimes more, according as the Earth is conditioned, and thus you shall make your first ranke: then you shall driue in an other ranke of *Palisadoes*, being six foote long, vvwhich are set behind the first ranke, to the end they may run in a right line vvith the first, but must be struck in a little sidelings, to the end, that their nailes may fill all places necessaric, and the heads of these *Palisadoes*, ought to stand about halfe a foote higher, then the others: In the same manner you driue in the third ranke, vvwhich must be half a foot higher then the second, and thus you may doe, if you vvill driue in a fourth ranke, yea as many as it pleases you. These *Palisadoes* are represented unto you in the 164. figure.

For the *Palisadoes*, vvwhich are used against assaults there are two sorts of them. The first is that sort of *Palisadoes* vvwhich are sett upon the *Parapets* of Forts, *Outworks*, and *Redoubts*, for to hinder an Enemy that they may not so soone assault or scale a place: these ought to be 3 or 4 ynches in *Diameter*, and some 6 or 7 foote long, vvwhereof the half past is driven into the *Parapet*, and the other half stands upright.

For the other sort, those great headed piles or pales, clasped together vvith chaines, and plates of yron, vvwhich stand alwaies upon *Rampards* and *Bulvvarkes* covered vvith a little roof against the time of necessiry, vvhen as an Enemy seekes to assault a Fortresse. For by this meanes he is repulsed, vvhen he vvould scale a Rampard, because these *Palisadoes*, or logs

being cast downe a vvall, annoyes greatly the Beseigers, in regard of their vveight, vvhich they are not able to resist, though they be armed with head peeces.

OF PALISADOES, PALES, VRIZ-RVY-
TERS, CAVALLIERS DE FRIZE,

Called in English Turne-pikes.

THE TENTH CHAPTER,

WEe haue observed in our declaration of Originall names vvhen, the *Cavalleries De Frize* tooke their name: to witt, at the siege of *Groeninghen in Frizeland*, vvhere they served for great use, by stopping and hindring the Enemies horse, when they came to relieue the Town, and then got this name of *Frize ruyters* in Dutch, *Cavalliers de Frize* in French, and *Frize Horses or Turne-pikes* in English, and besides the stopping of a suddaine charge of Horse, they are of excellent use, to be clapt on the topp of a breach, or some vvake place of a Trench, or a vvall, and good store of them ought to be carryed along vvith an Army on vvaggons, to be sett up in some *Avenues*, or passages, to stop and hinder the sudden attempt of an Enemy, vvhen one hath no time to cast up a trench.

In Fortresses they are also of greater use then chaines or Barres, vvhich crosse the streets, For a man may skip over a chaine, and a good Horse will leap over it: But being beset and crossed vvith *Turne-pikes*, neither Foot nor Horse are able to passe over them, seeing they have staves and sharp points through them on all sides. They may be set up also in the streets of *Suburbs* and other places instead of Barres, and vvhere some broad places are to be kept, in joyning many of them together, vvhich is done ordinarily in the expeditions of Warres.

They are made in this manner following, you take a tree of firme wood, vvhich will not cleave, vvhereof the *Diameter* is five or six inches, and some 10, or 14 foot long, vvhich is made vvith six corners, so that it hath six sides, and in the midst of these sides, one bores three or foure inches one from another cros-wis, and the puts through these holes round javelings, vvhereof the *Diameter* is an inch and a half, or at the most two inches, the lengt of them is six or six foot, and so made, that they are all of one length, which are made of a strong and a firme piece of timber, which will not easily bend, nor will be weakned by raine, these are thrust through these holes, so that they are of a just length on both sides, and have as many javelings on the one side, as on the other: so that the *Turnepike* is alike over all, and falleth alvvayes after one fashion, as it lies, and as one vvould have it. Both the ends of these javelings are headed, and sharp pointed vvith yron, and the ends of the tree are plated about vvith rings of iron, that the tree of the *Turnepike* may not cleave and in the middest of both ends there are rings and clasps made to tye two or three of these *Turne-pikes* together with chaines, if occasion should serve, all vvhich is represented in the 165 figure.

Where there are some *Banks* near unto a Fortresse or water, vvhere Shipping may passe to and again, or vvhere a water may be vvaded through, there are made pales or *Barriadoes*, represented in the 166 figure, which are made vvith Sparres of strong vvood, squared out, being some 4 or 5 inches big, and some nine or ten foot long, vvhich are set between 2 great posts, about 5 or 6 inches one from another, as ye may see in the 166 figure.

The fouresquare *Tanternails* is a very necessary thing for defence, having alvvayes one of the points standing upvvard. For they have foure points as sharp as a naile, vvhereof three stands upon the ground, and the fourth howvvsoever it lies, standing bolt upright. They are of divers greatnesse, for those vvhich are commonly used in this Country, are lesser then those

those which are cast into a Moate. The point whereof 3 or 4, or 5 inches long. A Fortresse ought to have good store of them for to cast them into a moate, into a Fallebray, or upon a Breach, because they prick and hurt shroddly the Souldiers feet, which strives to enter. They are represented to you in the 167 figure.

Your *Dodanes* or *Beares* made of stone or brick are set upon a banke by a river side, to keep the water from overflowing, (or running out of a moat. The Dutches calls it a *Beare*, because it represents the shape of a *Beare*, but the French terme it *des d'Asnes*, and of one word corrupted *Dodanes*, that is, an *Asses* back, because it hath some resemblance of an *Asses* back, upon which disobedient Souldiers, who committed some notable offence must ride upon some houres one after another, which we call in English a *Woodden horse*, and hath the fashion of an *Asses*-backe.

Master *Symon Stephens*, Prince *Maurice* his old Mathematician, in his new Booke of Fortification and Sluces, makes mention of some great faults committed in the making of these *Beares*, because the foundation, which should sustaine and beare up this *pondalus* Work, ought to be exceeding strong, and soundly laid, for otherwise the expence, and the labour, which it costs will be cast away in vaine. For the preventing whereof, he gives good counsell to sinke into the bottome of the moate, piles or *Mastinces* bound fast together, and of one and the same bignes and length, which wil make a strong and a firm foundation, when upon afterward you may build your *Beare*.

It must be made a good deale higher, then the water, when the tides, or the rivers are swolne up to the very bankes, and it must be made so thick, that it may be able to resist the force and violence of the water, and the stones and bricks so laid and plaistred together, that the water cannot eat or soake through it. And because these *Beares* in moates might serve as a way to straddle over and get into the Towne or Fortresse by, at both ends there is two palissadoes set the one upon the banke, and the other one either side next the Moate, as you may see in the 166. figure before which also is struck into the ground many other small palissadoes of 4 or 5 foot length before mentioned. But the top of the *Beare* is made with a sharpe Edge, and in the midst of it a little round *torris* to hinder, and keepe backe those that would clime over it: Sometimes there are made two round turrets when it is made over a broad water or moate, the figure 168 will shew you the *penetrature* of such a *Beare*.

OF RETRENCHINGS, OR INWARD CUTTINGS OFF,
AND HOW ONE MUST RESIST

AN ASSAULT.

THE ELEVENTH CHAPTER.

Interiour.

THE Art of Fortification is not onely of perfect Fortresses, provided with all kinde of Outward-workes, but also hath besides an other use; seeing that it teacheth also how one ought to prepare and furnish a Towne or Fortresse with new workes, When the others are ruinated. This part of Fortification is called in French *un Retrenchement Interieur*, in Latine *Recessus*, and in English *an Inward Cutting off*: because such workes are made to no other end, but to make a Retreat into, when the others are lost. For, when one cannot maintain, and defend a whole worke, or a part thereof, because an enemy striveth with all his power to become master of it one must then resolve, when he is driven out of one work, how he may retire into another, and defend himselfe againe, against the assault of an Enemy, because it would be very hurtfull to defend one selfe, when he lies open to an Enemy.

This *Inward Cuttings off* is of two sorts, the one in *Outworkes*, the other in a *Fortresse* it selfe.

Besides, it is in *Generall* or *particular*.

Wee wil first handle the *Cuttings off*, which are made in outward workes, which are the first, which an Enemy seekes to take in, and afterwards the *Cuttings off*, which must be made in a Towne or Fortresse it selfe.

Touching a generall cutting off, it is only used in Crown-workes, Horn-workes, or Tenaillles.

The same is also of two sorts. Regular, and Irregular.

A Generall cutting off is, when a worke is made in all things like unto that, which is Cut off, in such sort, that a Crown-worke is made within a Crown-work, a Horn-work within a Horn-worke, and a Tanaille within a Tanaille.

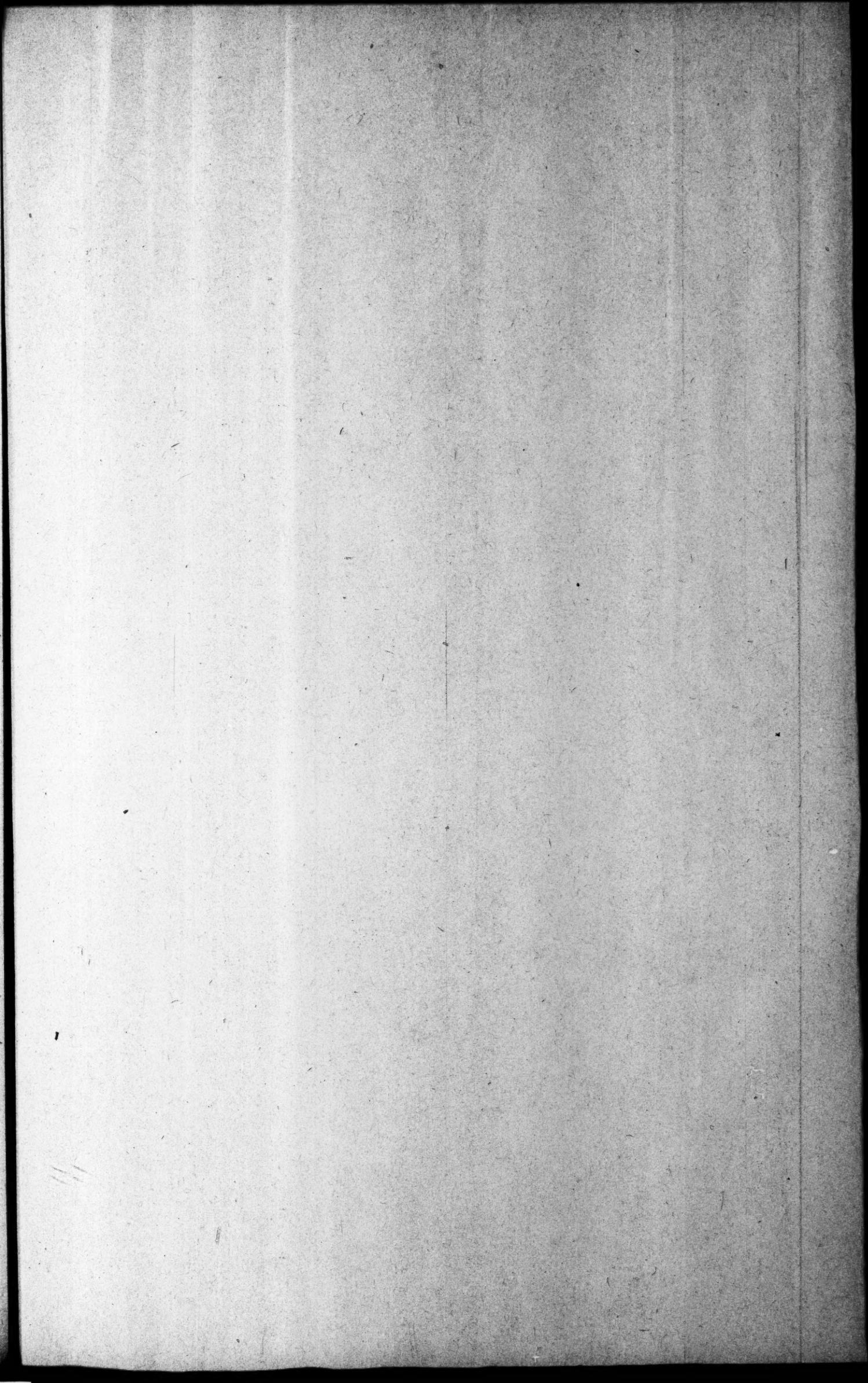
Irregular cuttings off of outward workes, is that which is that which keeps not the form of the worke, which is cut off within, yet Nenerthelesse shutteth up the worke with a continued Parapet.

A particular cutting off is, when a worke is made out of broken workes, or severed one from an other, in such wise that there is made one, two, or three Reuelings, in stead of a Horn-worke, or two Demy Bulwarkes.

You must observe well, touching everykind of cutting off here set downe, that they may have a good defence, and if it be possible, that they may also be defended from some other places, and that they lie open to that side which looks into the Towne or Fortresse besieged.

A Generall cutting off in Crown-workes is done as followeth, one falls backward some 20 or 24 foote, yea more or lesse, according as the condition of the place is, and as necessity requires, and one makes the work within it, like unto the other which is cut off. And though his work being cut off, is lesse then the other, yet it will give an Enemy enough to doe when he shall attempt the taking of it in. Your Crown-workes are made commonly after the proportion of a small Fort Royall, where the proportion of the Polygons are of 55 50 or 45 rodd, When you resolve to cut off a worke a little more inward, it will become narrower in a regard of the great work, yet will be great enough to defend it selfe.

The Generall Cuttings of Crown-workes, will cost no great labour, which may easily be shewne, in regarde it is very common. An example thereof you may see in the 169 figure



THIS CHAP
TWENTIETH C
AT THE EN

ART WILL BE THE
I CHART APPEARING
END OF THIS FILM

gure: The cutting off being made, one is forced to make a ditch, between the worke quit-
ted and the cutting off, which ought nevertheless to be done, because one takes the Earth
out of the ditch, to make up the cutting off withall: one must observe also that this cutting
off must be made, as strong as possible may be. The cuttings off are made only, while an
Enemy is approaching towards you, but also when Towns and Forts are first fortified.

Your General cuttings off in Tenailes doth not differ from that which is made in Horn-
works, saveing that one make a Tenaile, in stead of a Horn-worke.

The particular cuttings off of Horn-works is after so many wayes, that one cannot shew
here all the kinds of them. A Cutting off is represented unto you in the 171 figure, where a
Horn-worke is cut off, and two Revelings made in the sides of it, which are defended by a
third, which are behinde the others: & though they have a sufficient defence of themselves,
yet the defence of the other Reveling is added to them over & above, and is defended from
the Tenaile, which is after it.

Besides this, there is another kinde of cutting of a Horn-worke showne in the 172 figure.
In imitating these cuttings off one may make many others, as necessity may permit, and as
an Enemy attempts upon you, all which is impossible to marke out here.

A Generall cutting off a great wall or Rampard is used very seldome, because the Be-
siegers and the Besieged will at last grow weary thereof, Nevertheless, this hapned in the
seige of Ostend, which lasted three yeares, three months and odd dayes: for as soone as the
Enemy had got into the wall by sapping and springing of mines, they presently had an other
Cutting off ready to entertaine them: in so much that during this seige, there were many
Counter-approches against approches, Counter mines against the Enemies mines, so that
the Enemy could not get for a long time scarcely an inch of ground upon our men, for there
were above forty mines sprung on both sides, & when the Earth fel out, men fought for that
and turned up the Earth against them, for these Generall and Royall cuttings off, lasted, till
the Enemy had got more then halfe the Towne, before they gate over the whole. And
though such a seige, and such a great cuttings off, happens but seldome, yet you shall see an
example thereof in the figure 173, where is showne how one ought to quit a whole part of
a Towne, or Fortresse, vvith the Curtaine and Bulvvarks, and how one by a cutting of a
Bulvvuarke, or a Curtaine is more usual, vvhereof vve savv an example at the seige of the
Bosch in the Vucher Bulvvarks as also the last year at the seige of Breda vvhere both the Gin-
nekeis and Haghish Hornvvorks, vvith both these Bulvvarks, vvere most dangerously cut off
Novv to represent unto you some cuttings off, vvwhich you may see in the 173 figure marked
vvith A, B, and C. The letter C shovvs you how one ought to quit a vvhole Bulvvark, and
how you ought to make your Capital line after a Bulvvark is cut off.

Likevvise other kinds of cuttings off of Bulvvarks, are represented unto you in the figure
174, 175, 176, 177, and 178, after vvwhich manner, you may make many others and change,
and order them, as an Enemy comes neere you, and as the commodiousnesse of the place
shall require.

It happens also sometimes, that Curtaines are cut of invvardly, vven as an Enemy may
assault them vvith advantage, becaus of their length. You may then cut them of as is shovvn
in 172 figure, vvhen you have time enough to cut them of Royally. But if time vvil not per-
mitt you to make a royall fortification, then you must make use of Traverses.

It is impossible to cut of a Fasse-bray, because of the little space, vvwhich is in it. Notvvith-
standing one may cast up some Traverses in it, especially on that side, vvwhich the Enemy seeks
to take in, and tovwards vvwhich part he vvould advance his gallery, to the end you may not
give too much to an Enemy, but keep and maintaine the place as much as possible may be.
For the Besieged may lay hold on the same advantage, as their Enemy doth, vvhen he is once
got into the Fasse-bray, and though vvhen he is in that they may cover the roof of it vvith
planks one may nevertheless set fire on it, and disaccommodate the Enemy on all sides.

As for other vvorks as Revelings and Halfmoons, you may see how they are cut of after
the same manner, as the Bulvvarks are, if the vvorke vvwhich is to be cut of be great enough
and have place enough in it to be cut off.

But forasmuch as all this here shewne, concerneth principally the defence, which ought to bee considered in ordinary Fortresses, so one must have a speciall care to the materials whereof these workes are made: for in making of them, you must choose the best Earth that is to be got, which will make your workes the stronger.

In outworkes you may alwayes take in the earth, which is digged out of the moate. But because that sandy earth, or earth mingled with sand, is not so good, it is lyned with rise, or Brush, which is layd betwixt and upon it.

In great Bulwarks, where there is not Earth enough, and besides that is sandy, it must bee laid with rowes of Brush, driving them in with stakes, and spars of houses shor down with Canon. But when the ground is so sandy, that you cannot work it alone, then you must lay dung, and straw, and other things betwixt it to make it hold together, and you must wet the Earth as many times as is needful. You may fortifie your Parapets with Gabions, when you cannot make them other wise, and likewise you may set great musket baskets upon the top of the Parapet, that it may be covered the better.

In Outworks one may make use of the ordinary Profile, when you have time enough to make cuttings off, or you may make them long before hand. But the works which are made in great hast, have no certaine rule: howsoever, you must make them as strong as possible may be, and as meanes, and time will give you leave.

Touching the cuttings off of Bulwarks and Curtains, one can give likewise no certain rule, only this you must ever have a care, that all inward works, and cuttings off, lie open toward the Town or Fortres. with this proviso also, that they be not made so high, but that the great works may over-look and command them: For if the Rampard of the cutting off be lower, then the high Rampard of the Town, then the Enemies Canon can do it no great harm, because they are defended from the great Rampard. Again, the Enemy cannot discover the place and the forme of the cutting off, according to which one may governe themselves otherwise. It is certain also, that one cannot beate an Enemy from a high place, which is neer at hand, because he is blinded and covered with the Wall or Rampard.

All these things being finished, when one is assured, that an Enemy is ready to spring his Mine, which cannot be found out, one must then strengthen, & double the guards in every place, & bring your canon to those places, where they may most gaul and flank the enemy. One ought to have an eye, as well on other places, as only upon the Breach, which is made by the springing of the mine. For an Enemy hoping that he may have drawn, the most of the forces in a Town or Fortresse to defend the Breach, may attempt some other place of the Fortresse, which is not thought upon & so become master of such a place, which is not provided with a sufficient defence.

After that the Breach is made, the Besieged must expect to be presently assaulted, which they must maintaine and make good as long as possibly they can, by defending the breach courageously, in doing whereof, they must throw downe from the top of it, abundance of these Square tanter-nailes spoken of in the chapter before, for to annoy and prick the Enemy, when he seeks to mount up and to enter it.

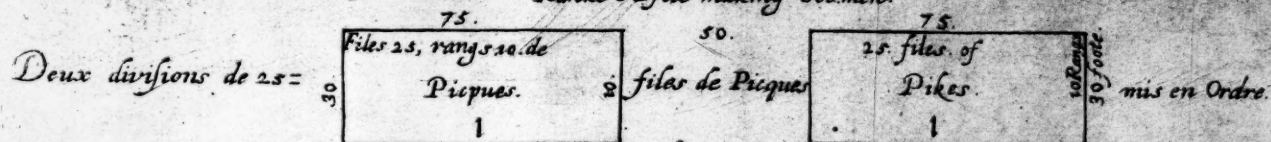
Vpon the top of the Breach also, if they have time they may cast up a brest-work, as Sir Francis Vere did in Ostend, or set up some turn-pikes, to hinder the Enemy for entring, and to strike in some Palissadoes upon the top of it, having Clubs, Flails, Stones: and Ashes, to offend them.

It is necessary, when the Enemy strives to enter it, that the souldiers fight courageously, & that the officers should encourage them with their presence to carry themselves like brave men, that being a place to gaine honour in, by giving them also premisses of reward, and when they grow weary, to see that they be seconded with fresh men, which stand in readinesse behinde the Rampard, to relieve them.

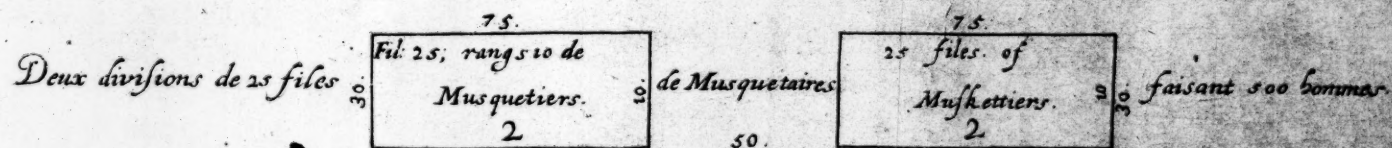
When they are not able to maintaine and defend the breach any longer, then they must retire into the cutting off, and take a new courage, and a heart of grace, in fighting behinde a new Rampard in making resistance as long as ever they are able, and thus much for the second part.



Two divisions of 25 files of Pikes standing in their order in Rank & file making 500 men.

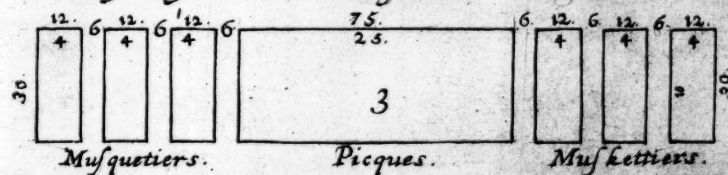


Two Divisions of 25 files of Muskettiers making 500 men.



Division de 500 Picques et Musquetiers en Bataille.

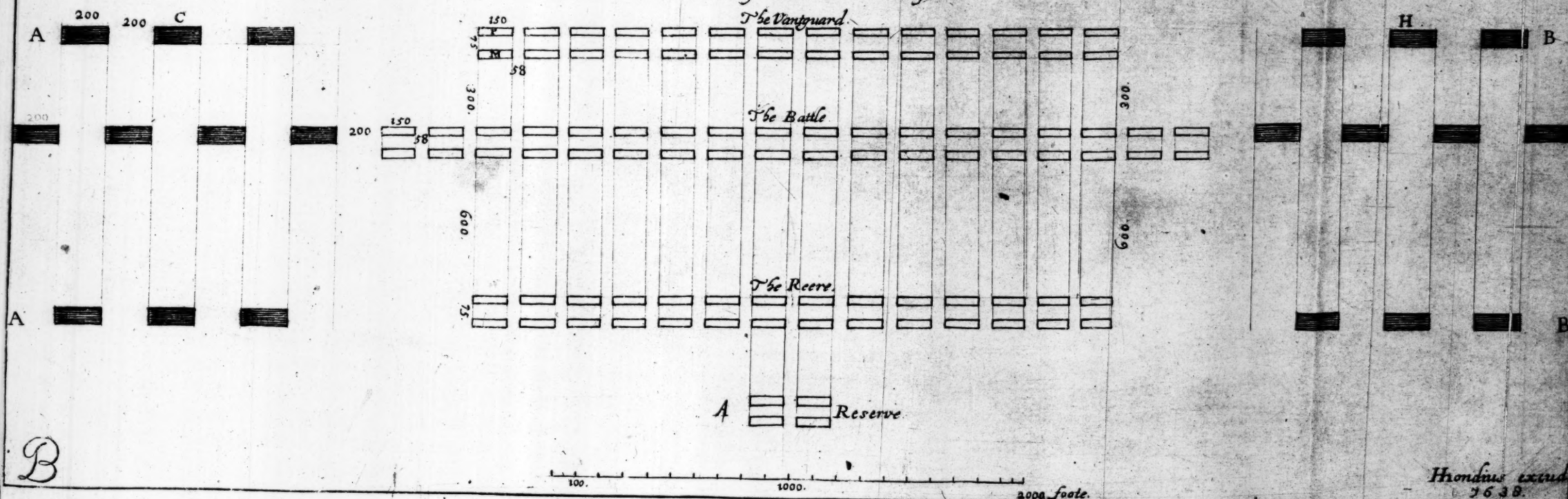
A Division of 500 Pikes et Muskettiers on battailed.



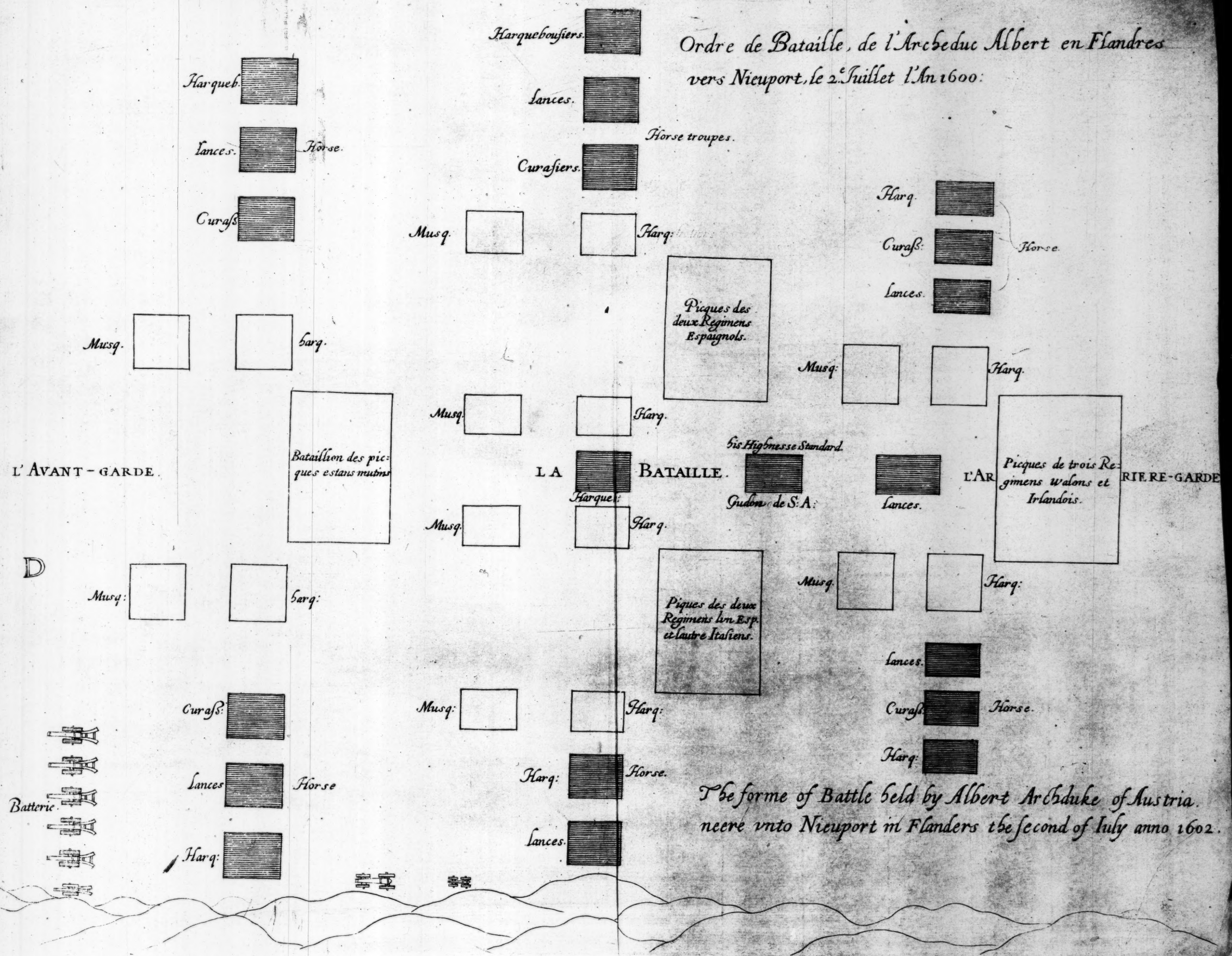
Ordre de Bataille de 24000. d'Infanterie, et 6000. de Cavallerie, Ordonné en trois Brigades, auquel le Front de A. B. a 500. pieds.

The Forme of an Armie of 24 Thousand Foote & 6000 Horse, ranged into three Brigades or Tercias.

The Front from A to B is 500. foote.



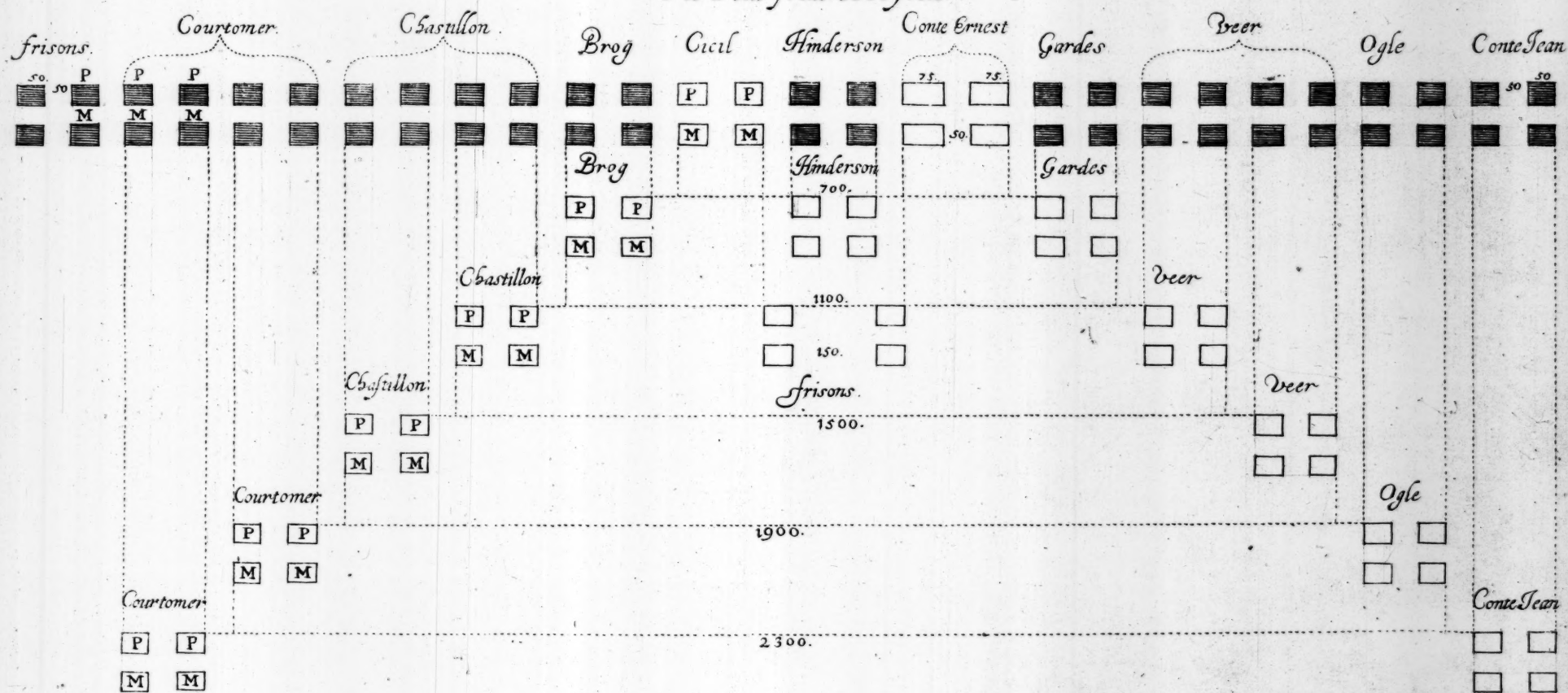
Ordre de Bataille, de l'Archeduc Albert en Flandres
vers Nieuport, le 2. Juillet l'An 1600.



Ordee de bataille d'Infanterie, ordonné par le feu Prince d'Orange Maurice, de tres-haute memoire. L'An 1605.

The second forme of a Battle of foote ordered by Maurice Prince of Orange of famous memorie before Rees Anno 1605.

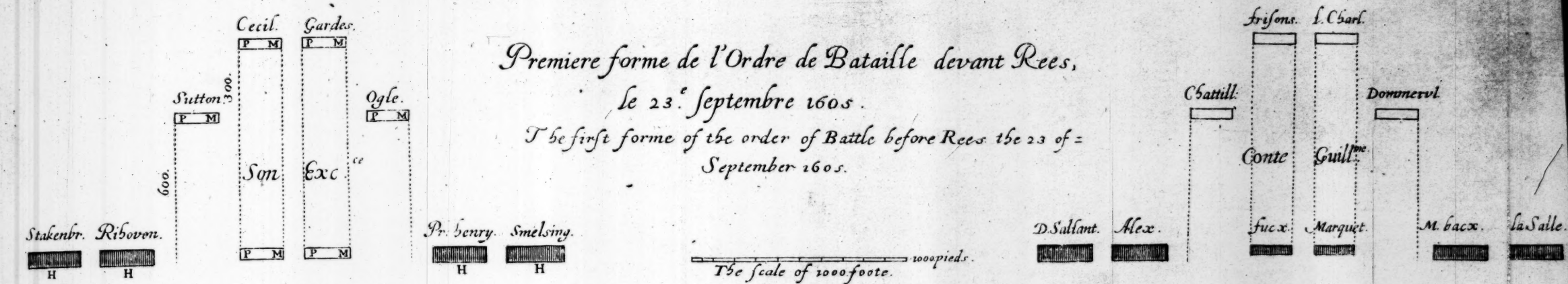
The whole front. 2600 foote.



The Scale of 2300 paces.

*Premiere forme de l'Ordre de Bataille devant Rees,
le 23^e septembre 1605.*

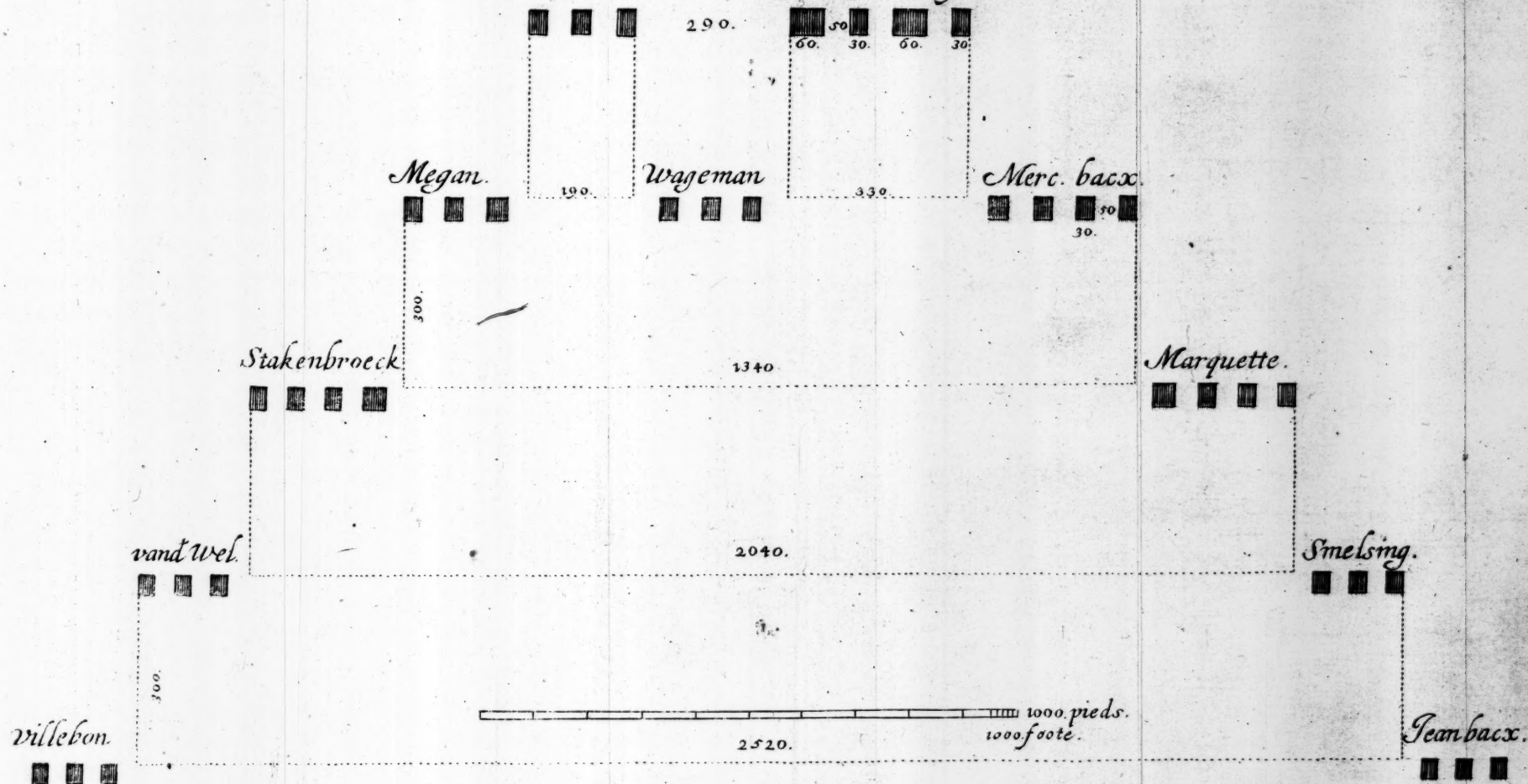
*The first forme of the order of Battle before Rees the 23 of =
September 1605.*



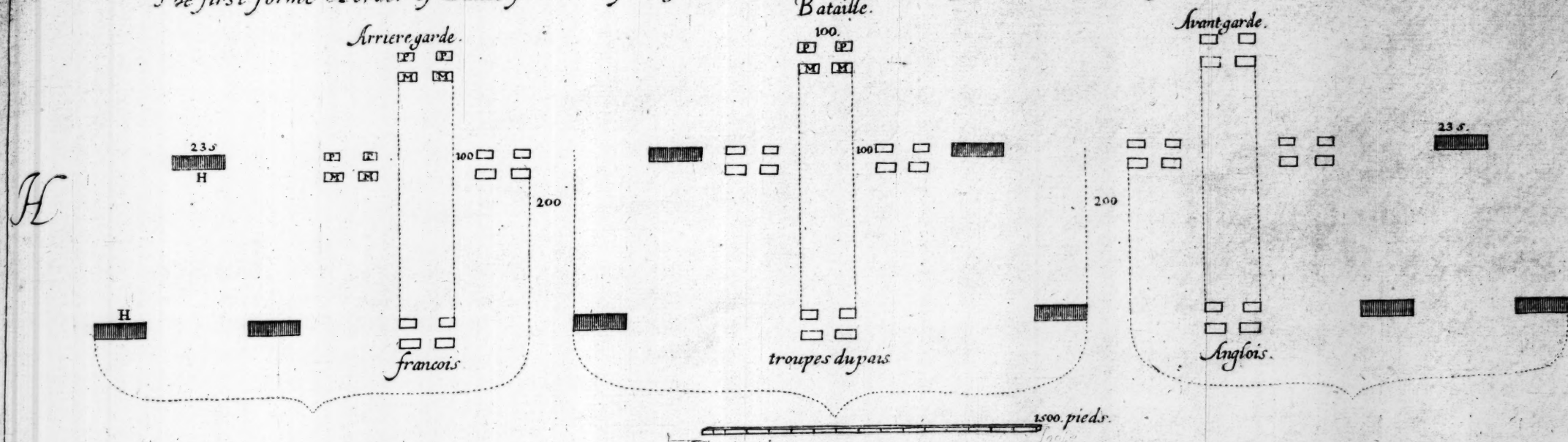
Ordre de Bataille de 37 Compaignies de Cavallerie devant Rees, le 23^e Septemb. 1614.

Tout le front est de 3000 peds.

*The Order of Embattailing 37 troupes of Horse before Rees the 23. of September 1614. the whole front is 3000. foote.
Riboven. Prince Henry.*

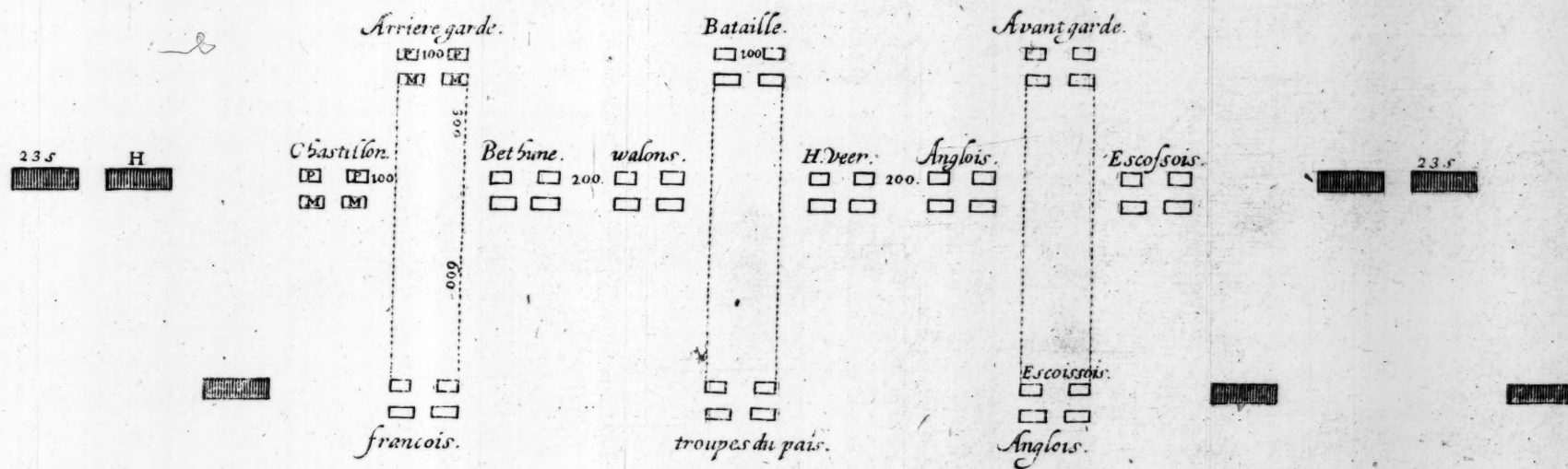


Premiere forme d'ordre de Bataille devant Juliers dressée l'an 1610. en marchant depuis Vorstenberg.
 The first forme & order of Battle shewne before Gulick anno 1610. in marching from Vorstenberg.

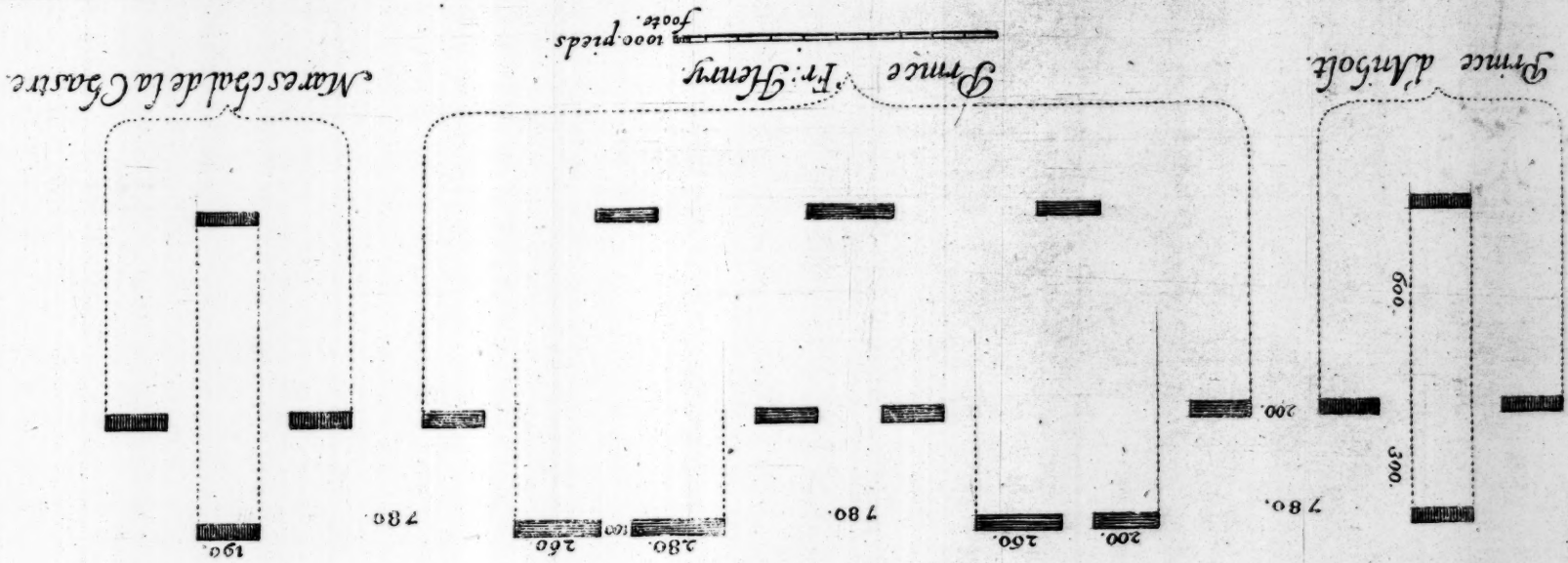


Seconde forme de l'ordre de Bataille dressée depuis Vorstenberg vers Juliers, le 22 Aoust 1610.

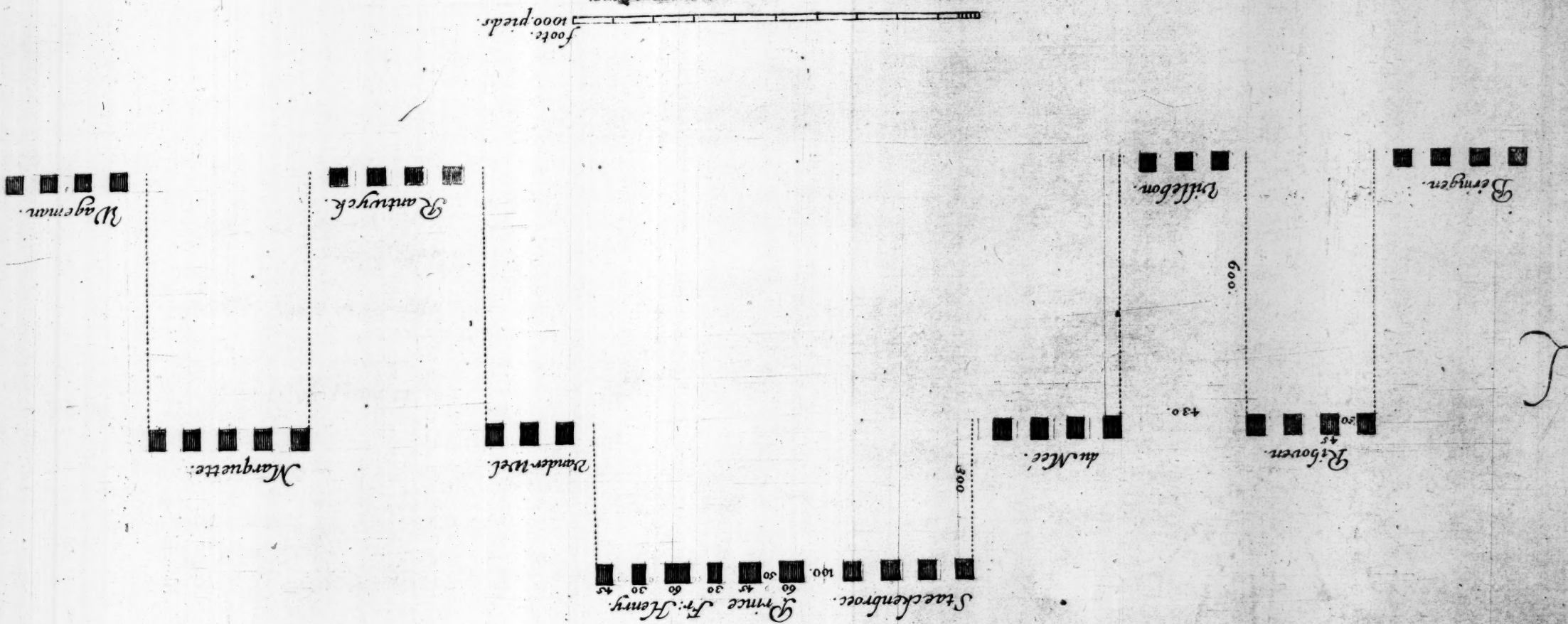
The second forme of Battle shewne in marching from Vorstenberg towards Gulick, the 22. of August 1610.



A Forme of Horse Embattailed before Gulick Anno 1610.
Ordre de Bataille de Cavallerie devant Juliers l'An mille sixcent et dix



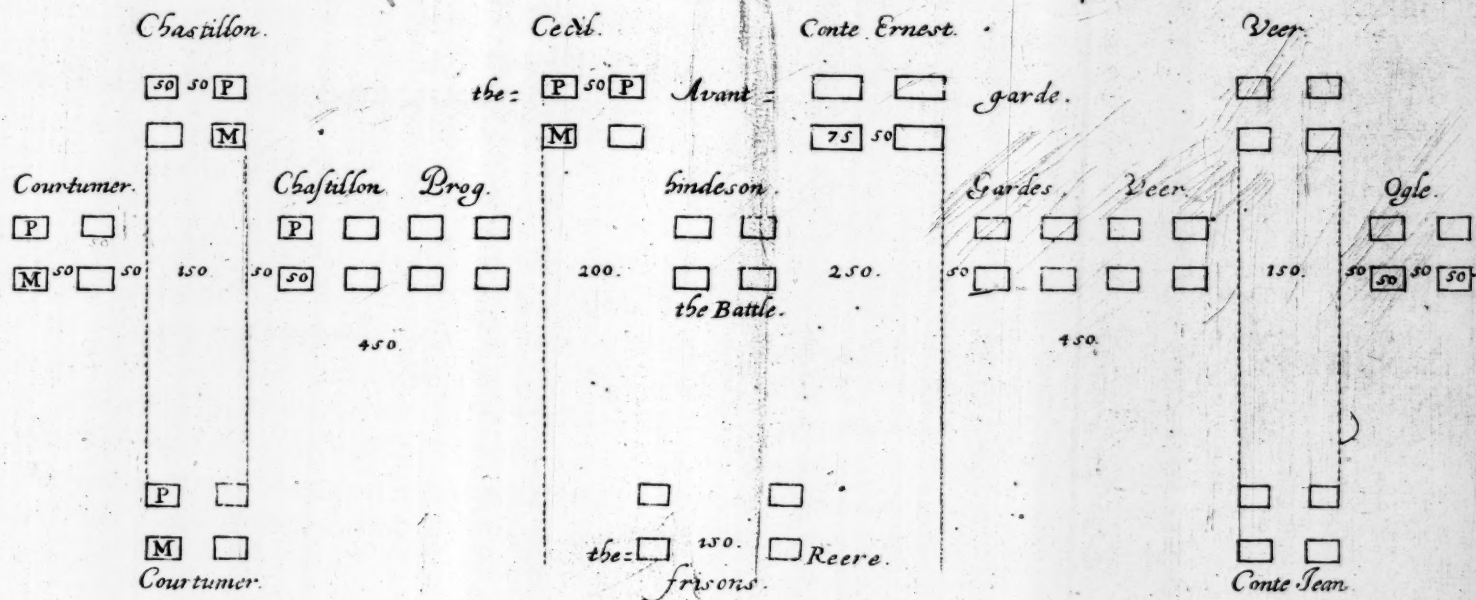
An other forme of Embattailing Horse shonne before Rees by his Ex^{ty} 1621.
Ordre de Bataille de Cavallerie devant Rees, ordonné par son Exc^{te} en octob. 1621.



Ordre d'Infanterie en bataille devant Rees l'An 1614 duquel le front est :
long 2200 pieds, et la hauteur 740 pieds.

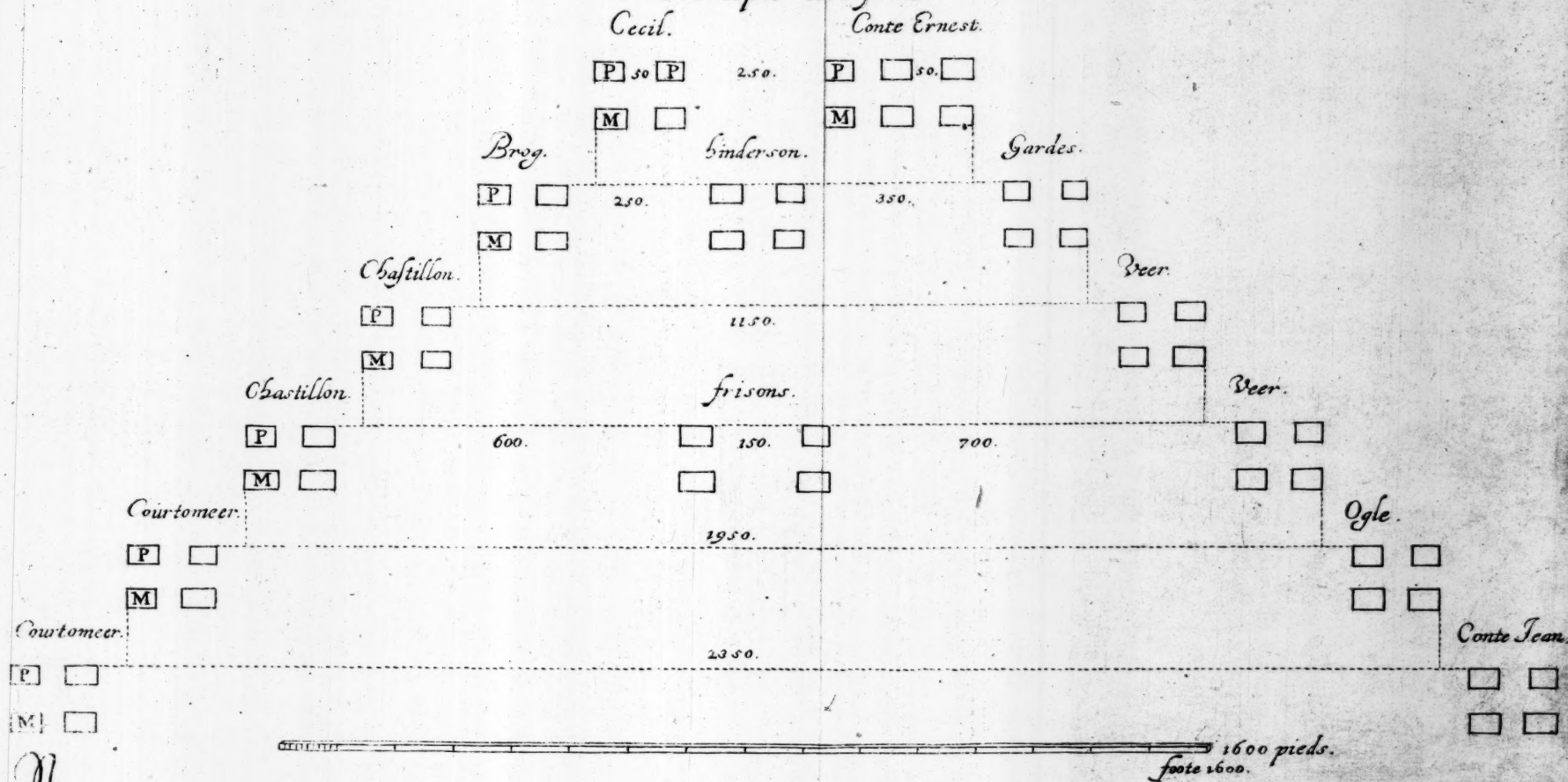
The forme of a Battle of Foote shoune before Rees Anno 1614.

The whole Front is 2200 foote. & the depth 740 foote.

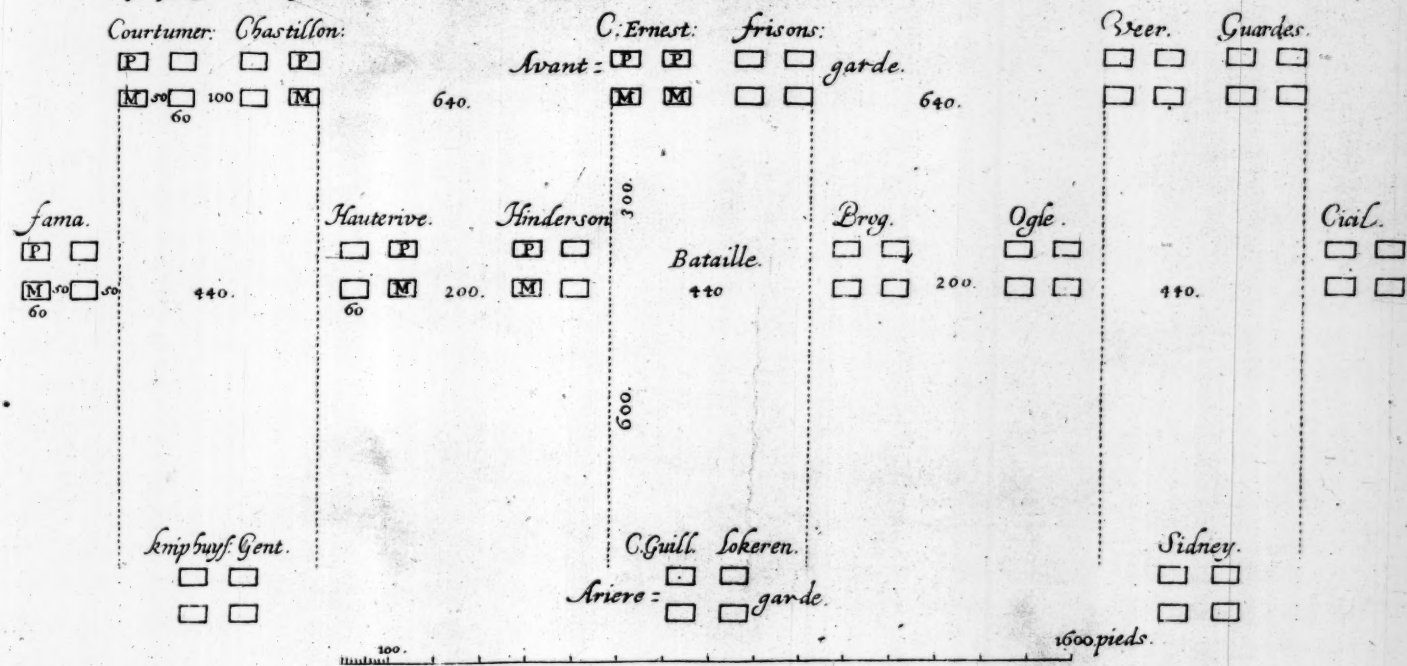


*Autre Ordre d'Infanterie en Bataille devant Rees l'an 1614. duquel le front est
long 2750. pieds, et la hauteur 1160. pieds.*

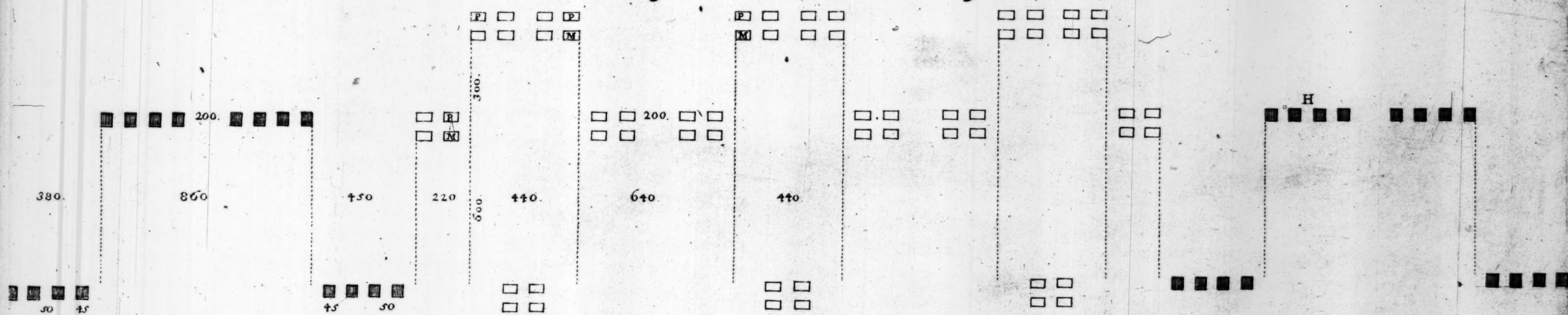
*An other forme of Embattail. foote shewne before Rees 1614. where the Front is 2750. foote.
& the depth 1160. foote.*



Premiere Ordre d'Infanterie en Bataille devant Doormick. L'An 1621.
The first forme of foote embattailed by Prince Maurice at Doormick anno 1621.



Seconde Ordre de Bataille de Cavallerie, et Infanterie, Ordonné par Son Exc.^e devant Doornick le 11. de Septemb.
Tout le front de la Bataille a 6380 paces



A Second forme of Horse & foote embattailed ordered by his Ex.^e before Doornick the 11. of September 1621.

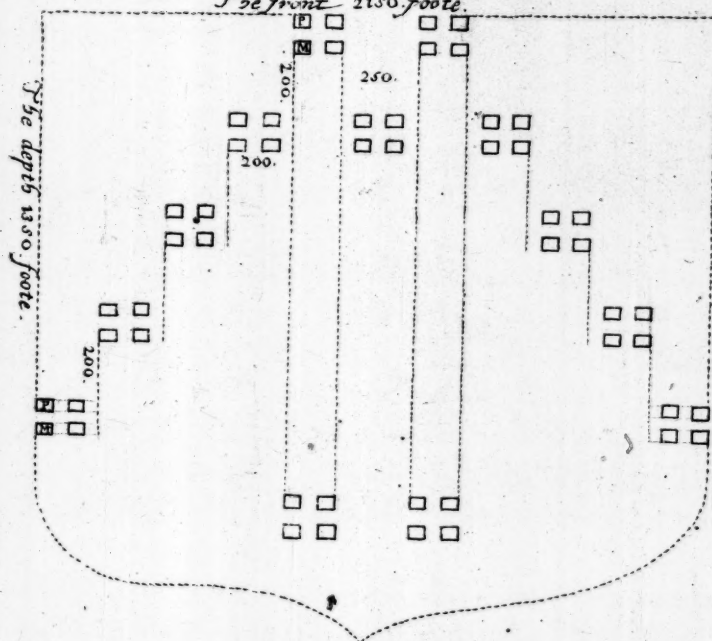
■ ■ ■ ■



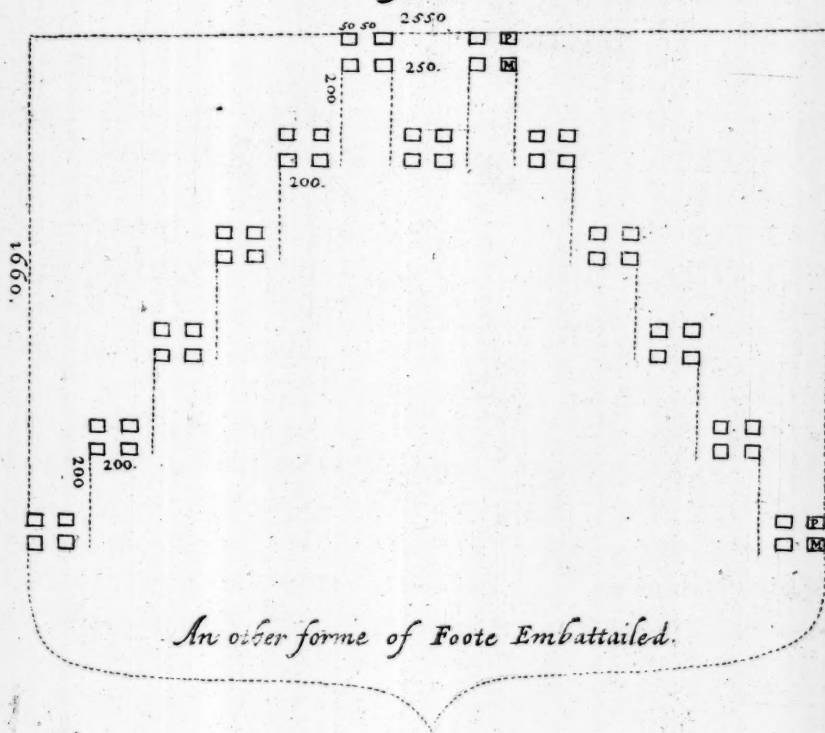
Infanterie en Bataille.

Foote Embattailed.

The front 2150. foote.



Autre Ordre d'Infanterie en Bataille.

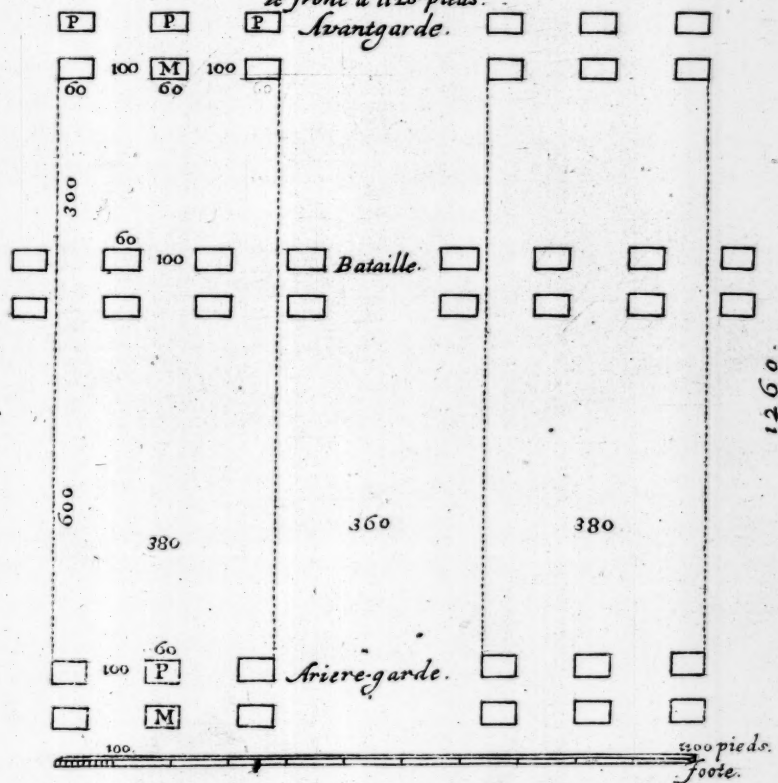


An other forme of Foote Embattailed.

Ordre d'Infanterie en Bataille pres Nimmege. 1624.

Le front à 1120 pieds.

Svantgarde.



Ordre de Bataille Ordonné par le Prince Henry à Walswic.

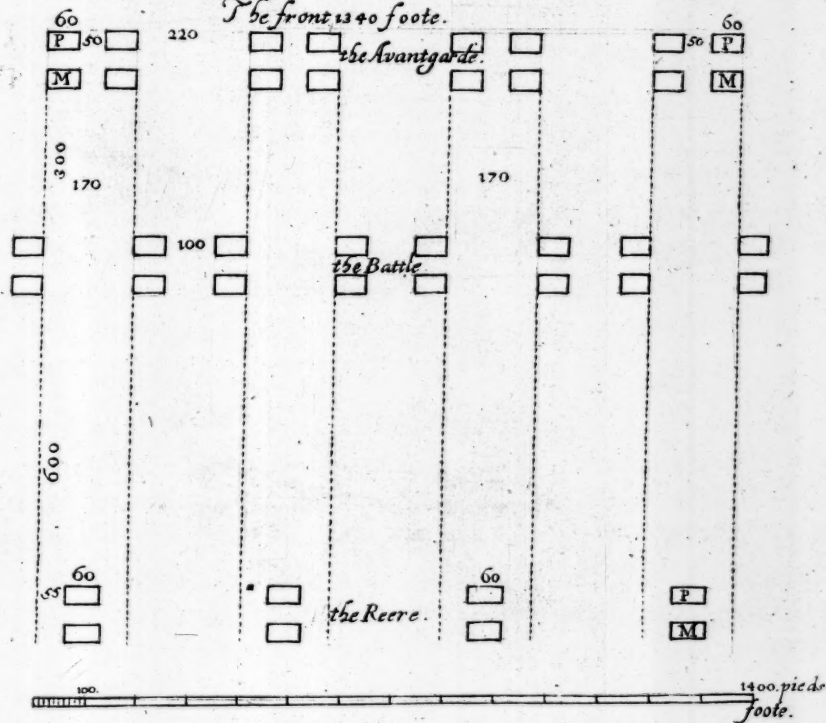
Forme of Battle ordered by his highnesse the Prince of Orange at Walwick.

The front 1340 foute.

the Avantgarde.

The Battle

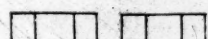
the Reere



Ordre-de-Bataille de toute

L'Armée, Ordonné par Son Altesse, devant le fort
de Voren le 4. de Juin 1642.

 Artillerie

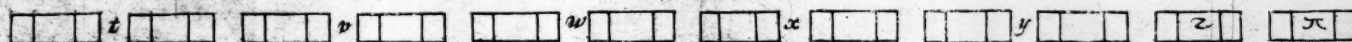
 Gardes.

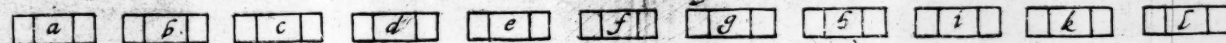
The order of Battell, ordayned

by his Highnesse before the fort of the Voren,
and shewne before her Maiestie the Queene off
England the 4. off June 1642.


- a. Nort-Holland.
- b. C. Guiliame.
- c. Brederode.
- d. ferens.
- e. Wynbergen.
- f. Verdoes.
- g. Oenima.
- h. Sterckenburg.
- i. Elskyn.
- k. Kricpatrick.
- l. Balfoer.

- m. Morgan.
- n. Herbert.
- o. Goring.
- p. Greving.
- q. C. de Salms.
- r. Erenbruyter.
- s. C. de Horen.
- t. Haulterwe.
- v. Maisonneuve.
- w. Collonghy.
- x. Douchan.
- y. Destrade.
- z. de Walen.
- π. Beverweert.

Francois.


Alémans. et Escoslois.


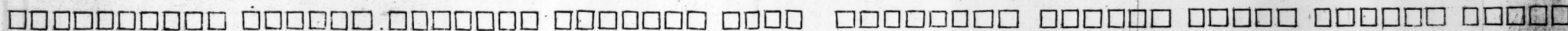
Anglois

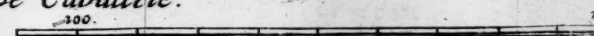

 Gardes.

Premiere fronte de l'Armée.

The first front of the Armie.


Alémans et Escoslois. *Anglois.* *francois.*


fronte de la Cavallerie. *The front of the Cavallrie.*

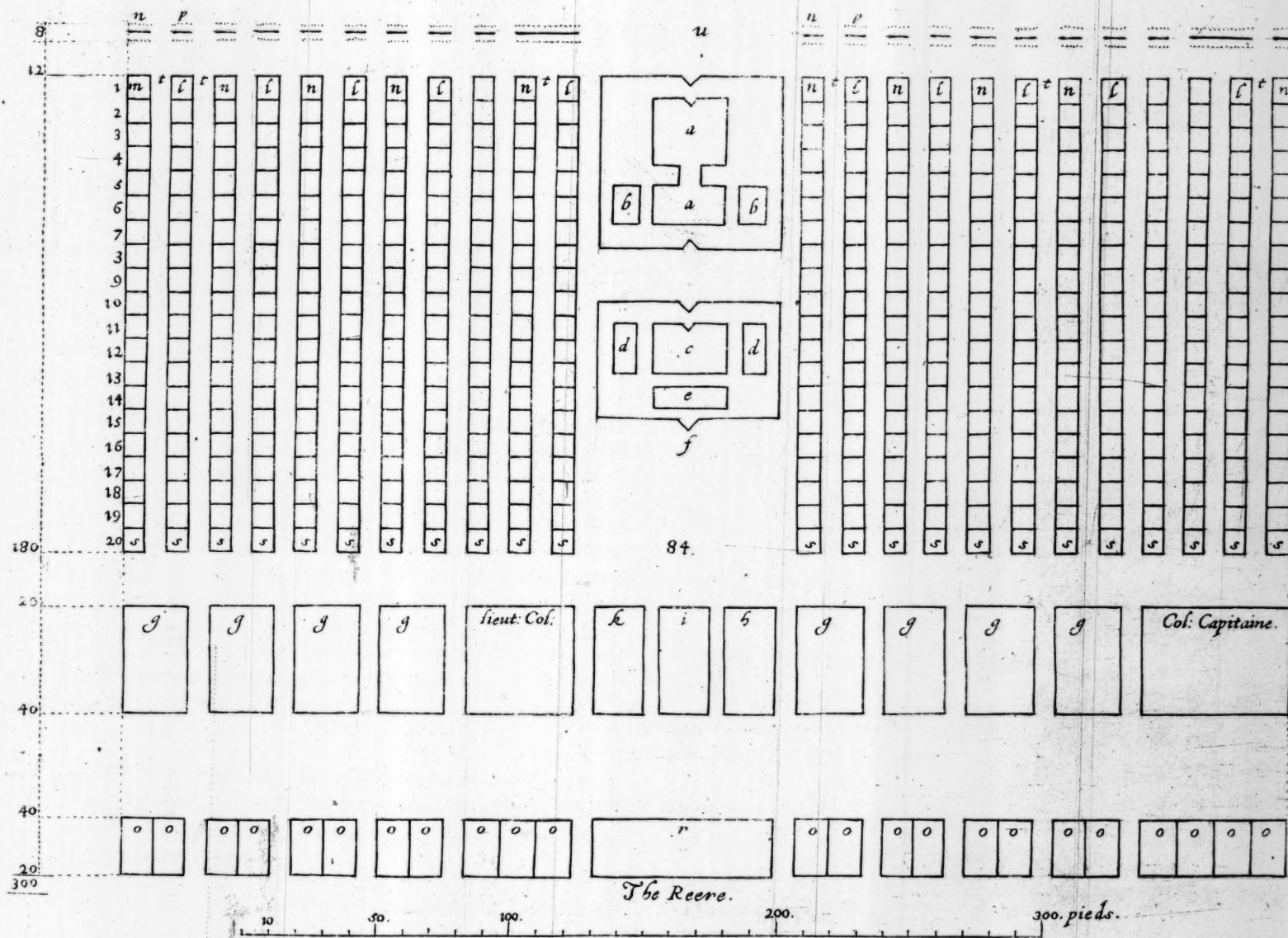
 1000. mille peds.
the Scale is 1000 foote.

X

Quartier d'un Regiment d'Infanterie de dix Compagnies, selon l'Ordre de son Altezze: le front à 434 pieds.

His Highnesse forme for quartereng of a =
Regiment of ten Companies: the front is 434f.

The alarm place 200foote.



Quartier d'un Regiment de Cavallerie de 5. Compagnies selon l'ordre de son Altesse.
le front à 430. pieds

His Highnesses forme for quartering of a Regiment of Horse, consisting of 5. troupes.
The front is 430. foote.

The Alarm place 200. foote.

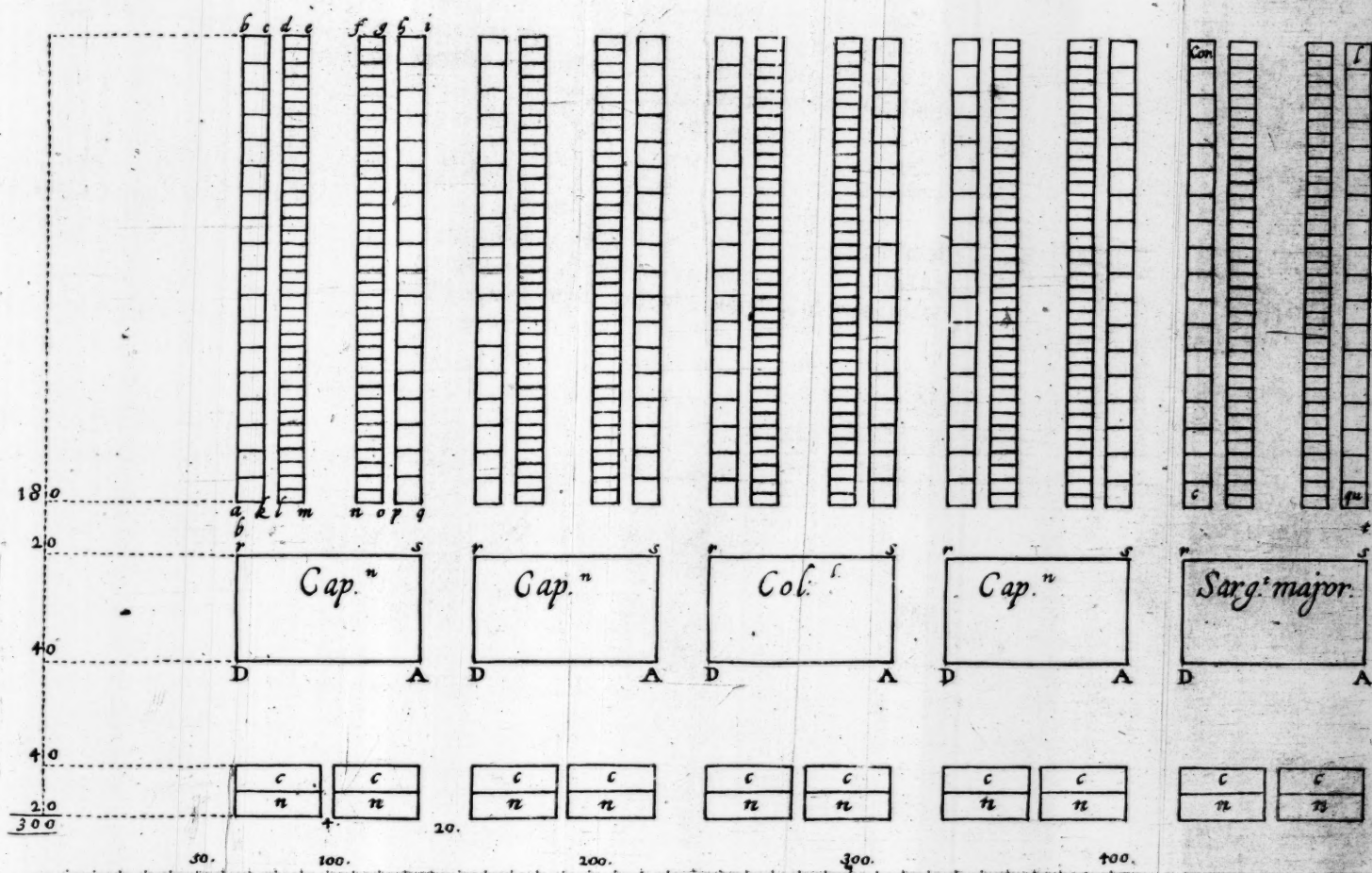
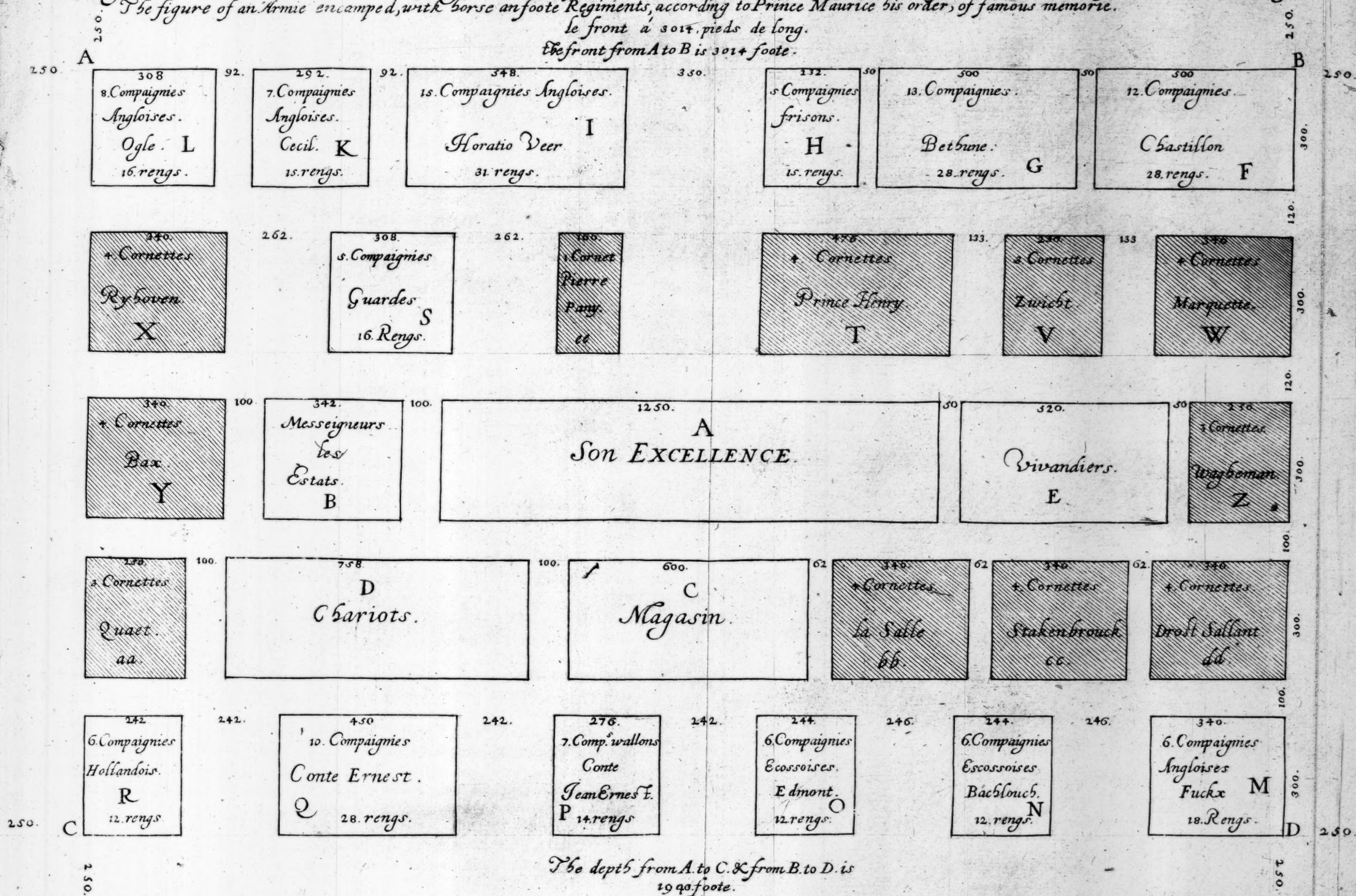
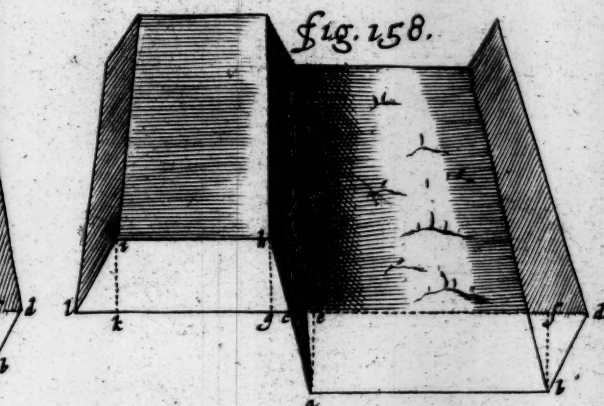
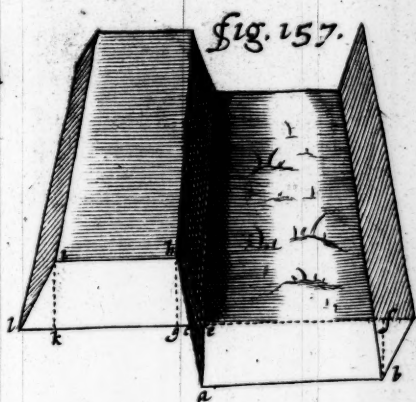
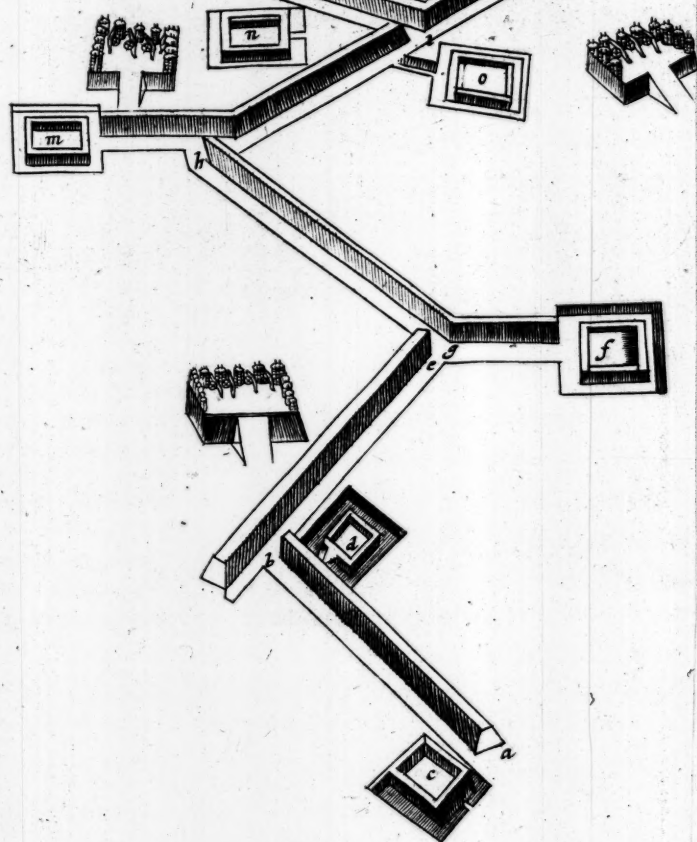
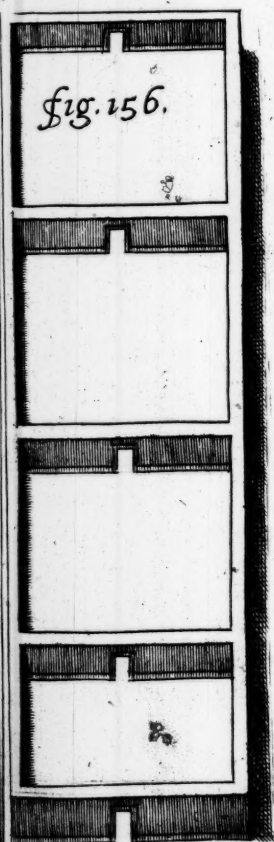
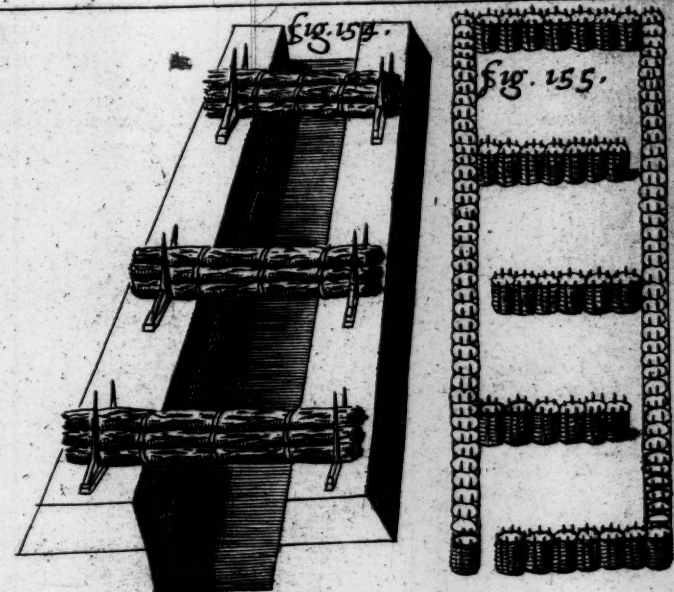
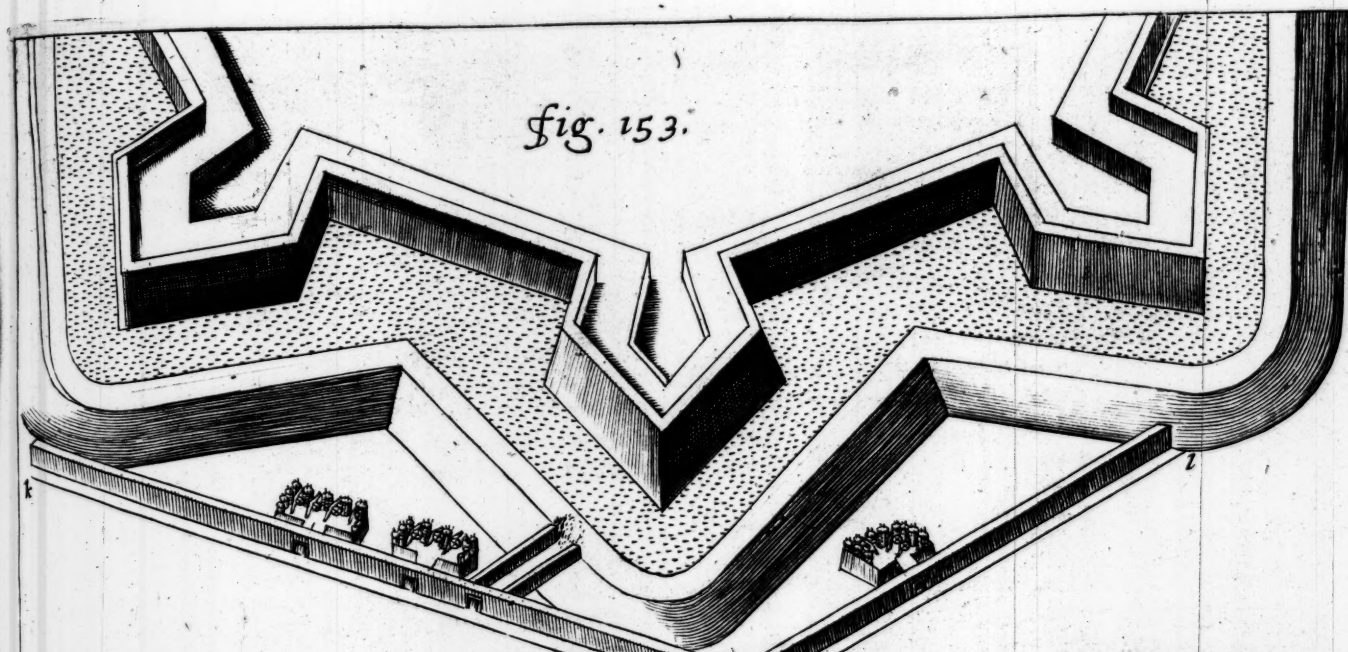


Figure d'une Armée en Campagne, avecques sa Cavallerie et Infanterie, selon l'Ordre du feu Prince d'Orange.
The figure of an Armie encamped, with Horse and foote Regiments, according to Prince Maurice his order, of famous memorie.

Le front à 3014. pieds de long.
The front from A to B is 3014. foote.



100. 200. 300. 400. 500. 1000. 2000. 3000. *pieds.*



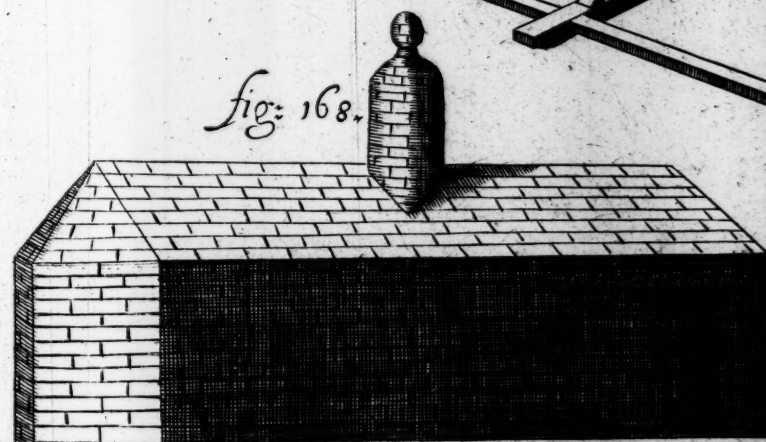
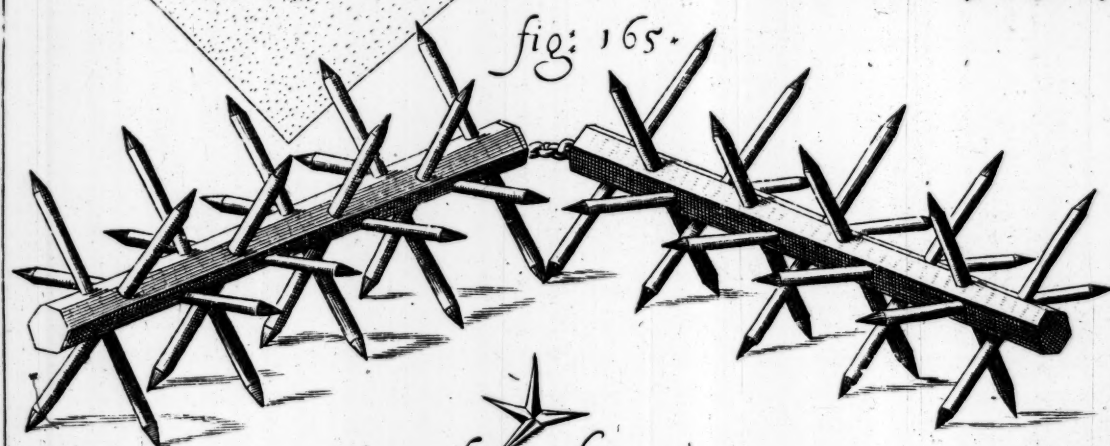
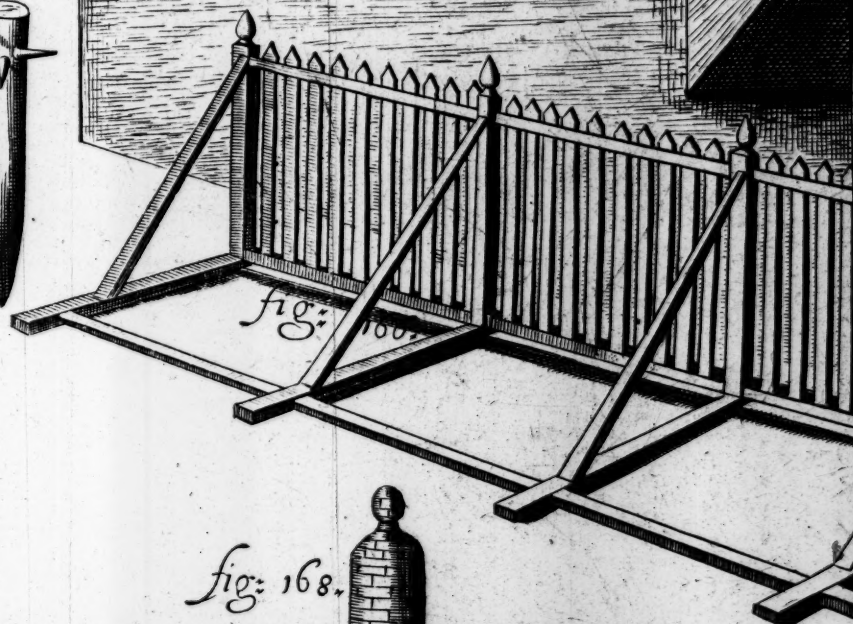
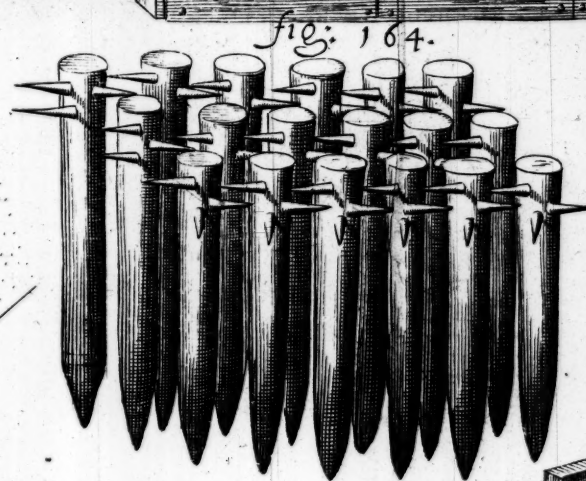
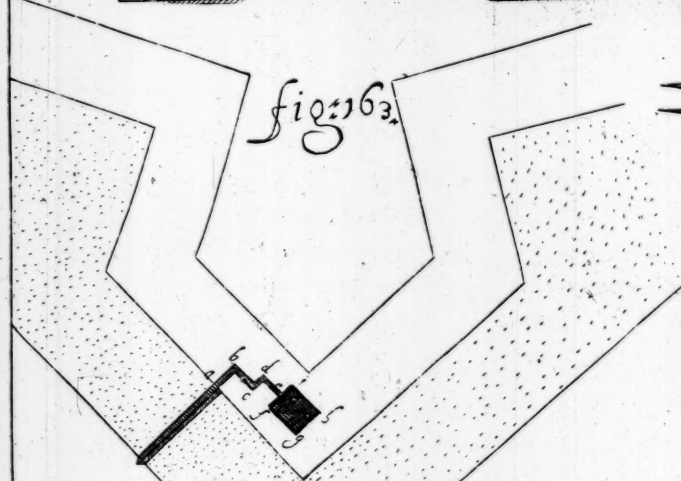
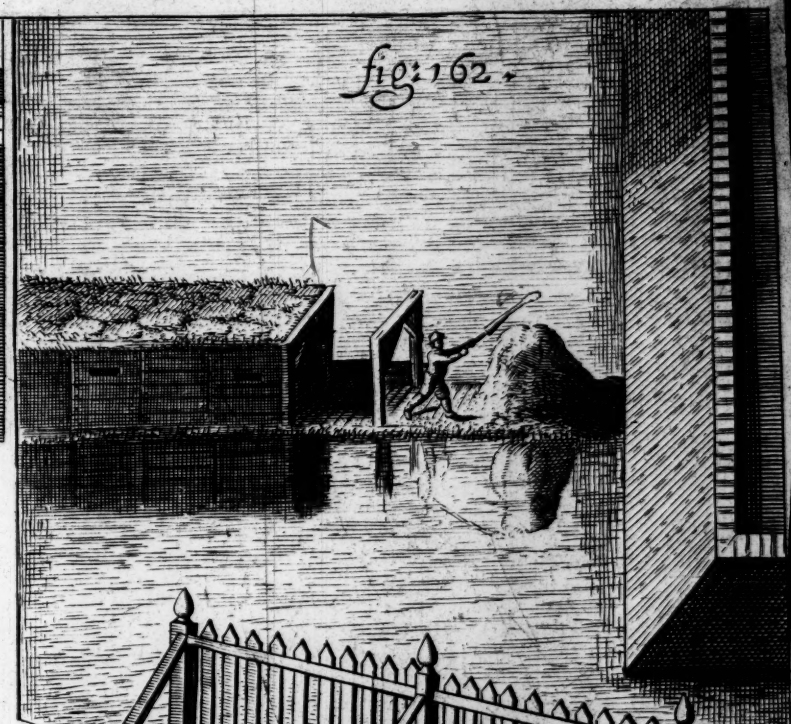
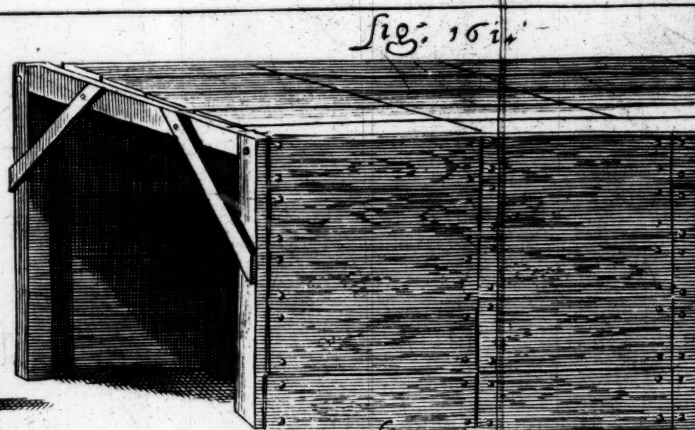
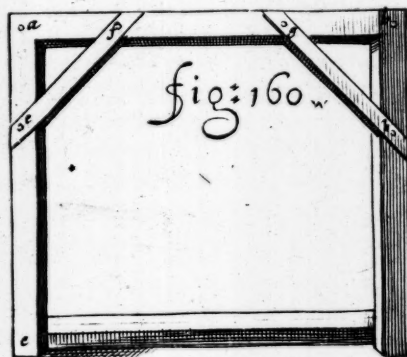


fig. 169.

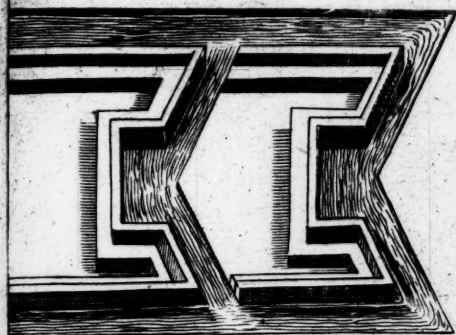


fig. 170.

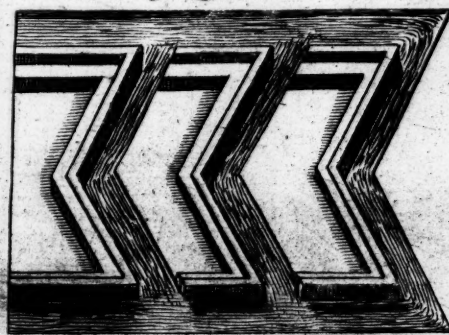


fig. 171.

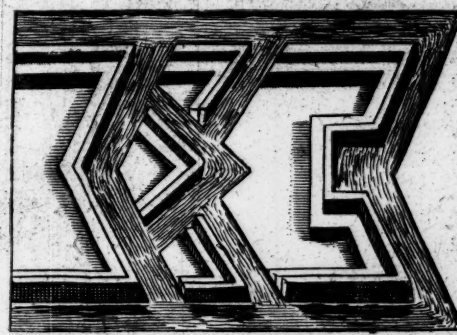


fig. 172.

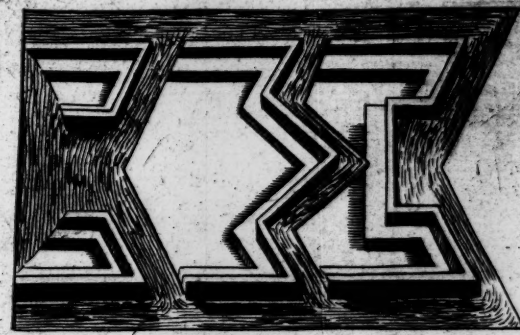


fig. 173.

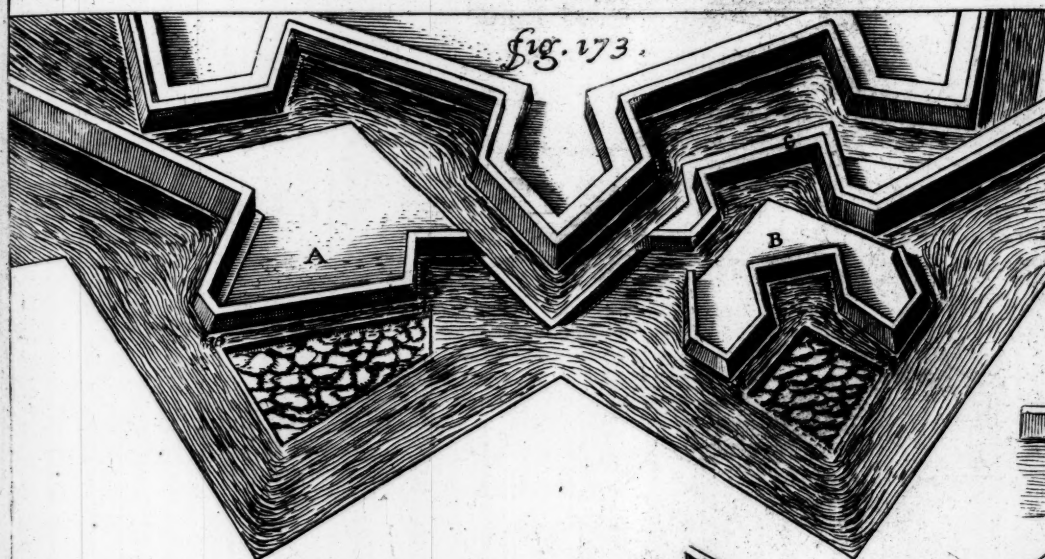


fig. 174.



fig. 175.

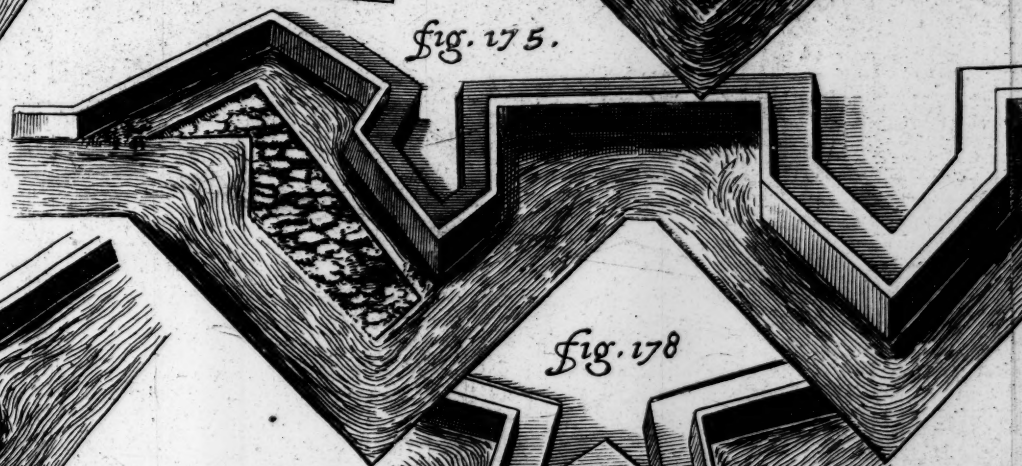


fig. 176.



fig. 177.



fig. 178

